

increase the annual loading rate, and can also affect the receiving water's natural ability to treat the pollutants (i.e. reduced residence time and diminished UV benefits).

- b. Altered hydrology can also increase the wash-off of other pollutants like sediment, which can also affect fecal coliform bacteria levels. Sediment that has been in contact with bacteria can harbor and transport those bacteria to other waterbodies. By making water cloudier, sediment can also hinder the ability of the sun's ultraviolet rays to penetrate surface waters and naturally kill bacteria.

4.2.2.3 Matrix of Types of Targeted Project/Retrofit Options

Based on the hot spot identification map and attributes described in the preceding sections, a strategic plan for the types of targeted retrofit options to address these hot spots has been developed. The attributes and the map of targeted retrofit options from the preceding section will be used to identify specific projects, locations, and implementation schedules which are discussed in Section 4.3 – Retrofit Opportunities).

A brief summary of each project type listed in the following matrices is provided below:

- ✓ Septic/Sewer/Reuse Programs/Projects
 - ❖ This is currently being addressed through the 319 projects, and an independent assessment of this concept has shown that it is a worthwhile program to address this point-source which is located along the waterways.
 - ❖ This can be considered a public or a public-private enterprise, based on the cooperation, but it will require homeowner activity and Town/County enforcement.
 - ❖ Future efforts may be able to utilize a new tool developed by Florida State University (FSU) and Florida Department of Environmental Protection (FDEP) that is expected to be released for public use in the summer of 2011. This tool uses GIS information (topography, parcel locations, soils) to estimate pollutant plumes from septic tanks. This allows for the prioritization of neighborhoods for inspection based on their potential to affect nearby waterways.
- ✓ Wildlife Programs/Projects
 - ❖ This source is one that should be considered part of the baseline of pollutant loading, but is more difficult to measure due to the location and mobility of wildlife. It is suspected that the wildlife source is deer, feral pigs and small mammals (i.e. raccoon, etc.) based on local observations.
 - ❖ The source problem does not include waterfowl, as flocks that stay for a portion of the winter do not reside in Bluffton for extended periods. Sizeable populations of local (non-migratory) waterfowl such as Canada Geese typically are the main source of waterfowl fecal coliform. Resident waterfowl are not common in the Bluffton area (based upon local knowledge and observation). However, the 319 program will be addressing roosting birds on docks.

- ❖ Culling is one method that may be needed, however more measurable information from a wildlife survey is recommended before pursuing such actions.
- ❖ The efforts of a local community (Kiawah Island) similar to the Town of Bluffton have addressed this issue and can be investigated. The Town of Kiawah Island has a staff biologist who conducts regular surveys of a wide range of wildlife. This is discussed further in Section 3.3.7 - Wildlife Management Policy.
- ✓ Stormwater BMPs to address runoff from altered hydrology
 - ❖ Structural BMPs, specifically retrofitted ponds or modified ditches, are intended to address impacts from the existing development. They are not intended to offset impacts from pending PUD projects. In some cases these structural remedies are intended to filter pollutants, including sediment which can carry bacteria. In other cases, while these BMPs cannot significantly reduce the current post-development runoff volumes, the extended detention times that they offer have been shown to mitigate the initial impacts. Runoff volume reduction is addressed through other means; most notably site planning tactics that include reduced disturbance and imperviousness, as well as increased infiltration opportunities.
 - ❖ This focuses on how flood control and general drainage features may be affecting water quality. An example includes deep excavation of ponds that intercept the water table and add a baseflow that promotes flushing of bacteria from ponds. This can reduce residence time, in turn hindering the natural processes that can remove bacteria from the ponds (see Georgetown County, SC 319 Project; SCDHEC & AMEC, 2010).
 - ❖ Likewise, reducing the amount of sediment reaching a pond can increase or maintain the natural processes in the pond (ultraviolet rays).
- ✓ Agricultural Programs/Projects
 - ❖ These are limited in their application within the May River Watershed, however, they can increase water quality awareness, as well as improve operations, to maintain the rural nature of portions of the watershed which will translate to a higher quality of life. Simple examples would be to encourage land conservation plans that can be funded through DHEC/EPA EQIP grants, as well as promote composting and provide education regarding improved composting methods for livestock. These actions reduce the amount of bacteria originated from these land uses, thus reducing the volume of bacteria transported to waterways. Lexington County, SC Hollow Creek watershed 319 Grant Project; SCDHEC & AMEC, 2011 is an example of a project implemented with these types of actions and awareness.
- ✓ Pet Waste Programs
 - ❖ This is a non point-source that the community has significant control over. In addition to being a water quality protection/improvement tool, it is also a quality of life issue. This affirms the importance of this part of the 319 project that is currently underway. While the magnitude of the load to the watershed from this source has not been

fully quantified, it does bring about the awareness needed to gain support for these programs and projects.

✓ **Runoff Reduction**

- ❖ Reduced pollutant loading can be obtained by providing appropriate retention/detention for runoff, or by reducing the overall volume of runoff. These goals can be achieved through:
 - Reduced clearing, and maintaining of the native vegetation and forested buffers along riparian areas.
 - Minimizing impervious areas by adopting revised zoning and development standards.
 - Promoting increased overland flow to reduce the runoff that must be treated by the stormwater system.
 - Using reduced runoff volumes and peak runoff rates to increase residence times for smaller water quality events.
 - Promoting design for alternative design storms, such as implementing the aquatic preserve standard, which over-detains smaller storm events such as the 1-year 24-hour storm event. This practice avoids salinity decreases due to dilution, reduces channel erosion, and maintains the ability of ponds to kill bacteria via UV rays by reducing turbidity and increasing residence time.
 - Enforcing the Town's stormwater ordinances that require development to control and infiltrate the first one inch of stormwater runoff from the entire development or maintain the pre-development hydrology of the property for the Water Quality Design Storm Event, whichever is greater.
 - Expand the Town policies that support an overall goal of water quality improvement to include runoff reduction techniques such as reduced land clearing, increased pervious area, increased overland flows, and increased infiltration.
 - Expand the Town's stormwater design standards to include further types of innovative BMP technologies in the Stormwater Manual's Appendix A, which will further reduce runoff. These can include practices such as rainwater harvesting, depressional medians for additional detention, treatment trains, bioretention areas, designing to minimum pavement widths, and vegetated filter strips, which reduce the overall runoff volumes for the watershed.
 - Transfer and purchase of development rights, which can minimize impervious areas and maintain forested buffers in environmentally sensitive areas.
 - Stormwater harvesting. This will capture the runoff prior to being discharged offsite, and allow for this volume to be utilized as an irrigation source onsite, which also promotes water conservation.
- ❖ For existing development (or redevelopment), reducing run off may be more challenging – but the impacts of that additional runoff can be reduced through other improvements, such as:
 - Roadway projects that have medians can be used to draw and treat portions of runoff that have the greatest potential to convey pollutants to the May River.

- Recreational facilities often have impervious surfaces (parking, rooftops), that can be mitigated with alternative surfaces and infiltration features. Such projects can become part of the outreach campaign.
 - Typical redevelopment, or the upkeep of existing development, can provide opportunities to reduce the amount of imperviousness and run off volumes associated with the parcel. Although they are not likely to meet the standards for new development, they offer an economical way to reduce replacement and operations costs. Specific examples include: implementing spread pavers that have been designed and constructed to have an increased service life and lower life-cycle cost; disconnecting downspouts and promoting sheet flow that waters landscaped areas.
- ✓ Education Programs
- ❖ Education is the activity that supports all elements provided in this Action Plan, and can have a continuous future effect on the water quality of the May River. Education and social marketing can be targeted at citizens, developers for private implementation, as well as administrators for policy making.
- ✓ Ordinance
- ❖ This is required to support changes and recommendations associated with this Action Plan. The ordinance behind the action is necessary to implement new policies that are in line with recommendations presented here.
 - ❖ The current ordinances have valuable information and regulations. The Town is currently updating their Unified Development Ordinance, and can use that opportunity to include further updates to the code. Items that can be included are as follow:
 - Continue to create ordinances that promote perviousness and less runoff (i.e. permeable pavement, landscape islands, buffers, etc.)
 - Correlate DHEC design standards for septic systems to water quality and stormwater requirements (i.e. if older septic systems prior to current DHEC design standards, can upgrade the septic system to appropriate design standards. However, if septic systems were designed to current standards and the area is still a problem need to consider switching septic to sanitary sewer)
 - Implement on-lot LID practices for new residential development.
 - Implement a tracking system to track effectiveness and implementation of on-site LID practices during the annual BMP inspections.
 - Define the Town's role in BMP and Septic inspections, and authority for code enforcement.
 - Expand the types of innovative LID BMPs in the Stormwater Manual Appendix A to include additional stormwater BMPs, including various structural BMPs, as well as expanding discussion on the current listed innovative LID BMPs, such as rainwater harvesting.
 - Provide incentives for private improvements that are in line with recommendations in this action plan.

- ✓ Incentives
 - ❖ In order to more widely promote the use of various recommendations presented in this Action Plan, incentives should be implemented to encourage participation.
 - ❖ Transfer of development rights incentives as described in Section 3.3.3.
- ✓ Land Acquisition
 - ❖ The Town should implement a land acquisition policy because future projects will require it.
 - ❖ There is upfront effort required to implement this type of policy, and therefore it is recommended to begin in the short-term.
 - ❖ The Town should coordinate the implementation of the TDR program with large land owners within the May River in strategic locations and provide the Town an opportunity to buy land targeted for development. Preserving this land will decrease future impervious area, thus increasing the protection of (or possibly improving) water quality.

The following table provides a list of potential strategies (i.e. types of projects, both structural and non-structural) for the pollutant sources of interest for this Action Plan: septic/sanitary sewer, wildlife/domestic animals, varying and altered hydrology. The general pros and cons for each strategy are listed in the table. The pros and cons of each strategy are then compared to the specific conditions for the May River Watershed and the priorities, resources, partners, and schedule requirements of the Town to identify which projects to omit from the Action Plan and which ones to plan to implement in the short, medium, and long-term.

Table 4-1: Potential Strategies for Pollutant Sources of Interest

POLLUTANT SOURCE: SEPTIC		
Type of Project	Pros	Cons
Connect septic areas to sewer	<ul style="list-style-type: none"> • Effective - removes septic as a source • New development in areas served by sewer allows for more flexible site design. 	<ul style="list-style-type: none"> • High initial capital cost • Feasibility along May River • Property owners resistance to paying utility fees
Septic Inspection Program	<ul style="list-style-type: none"> • Identifies potential sources • Ease of implementation • Low implementation cost • Program can be customized to critical areas 	<ul style="list-style-type: none"> • Only identifies problems, does not address them • Jurisdiction issues • Availability of inspectors
Septic Maintenance Program	<ul style="list-style-type: none"> • Addresses potential sources • Medium cost, with alternative funding options • Good success rate when incorporated with education, social marketing, and shared-costs programs • Program can be customized to critical areas 	<ul style="list-style-type: none"> • Jurisdiction issues • Property owner accountability <ul style="list-style-type: none"> ○ Problems must be identified ○ Reluctance to participate because of perception of being “in trouble” for problems ○ Resistance to paying for maintenance/ upgrades ○ Economic hardship for low- or fixed-income residents.
Septic Policy/ Ordinance	<ul style="list-style-type: none"> • Low implementation cost • Requires limited resources • Preventative measure 	<ul style="list-style-type: none"> • Political/ jurisdictional considerations • Feasibility of enforcement
Property Owner Assoc. Covenants, & Restrictions	<ul style="list-style-type: none"> • Low implementation cost • Requires limited resources • Preventative measure 	<ul style="list-style-type: none"> • Need consensus and voluntary support • Feasibility of enforcement
Septic System Cleaning Incentive Program	<ul style="list-style-type: none"> • Addresses potential sources • Medium implementation cost • Good success rate when incorporated with education, social marketing, and shared-costs programs • Program can be customized 	<ul style="list-style-type: none"> • Jurisdiction issues • Reduces property owner accountability • Need to develop a prioritization process that is perceived as “fair” to meet budget constraints
Septic retrofits	<ul style="list-style-type: none"> • Replace/upgrade with innovative septic technologies (e.g., recirculating sand filters) • Reduce pollutant loads in critical areas (e.g. stream buffer) • Adapt to soils that are not well suited for septic systems 	<ul style="list-style-type: none"> • Cost • Increased maintenance requirements

Table 4-1: Potential Strategies for Pollutant Sources of Interest

POLLUTANT SOURCE: WILDLIFE/DOMESTIC ANIMALS		
Type of Project	Pros	Cons
Physical barriers (e.g., fences)	<ul style="list-style-type: none"> • Effective 	<ul style="list-style-type: none"> • Maintenance • Aesthetics • Crossing Property Lines • Crossing jurisdictions • Crossing critical areas • Cost
Dog waste: Install signs to pick up after pets as well as pet waste stations	<ul style="list-style-type: none"> • Simple • Immediate impact 	<ul style="list-style-type: none"> • Maintenance • Cost and supplies
Expand forested buffers	<ul style="list-style-type: none"> • Provide more of a filter between wildlife and waterways • Lower population densities around waterways 	<ul style="list-style-type: none"> • Expensive • Not much incentive for private land owners
Reduce food sources for wildlife in developed areas (e.g., trash cans, dog food, bird seed); Include in nuisance ordinance	<ul style="list-style-type: none"> • Relatively low cost and simple. • Good Housekeeping practices 	<ul style="list-style-type: none"> • May be difficult to enforce
Re-introduction of predators of problem species	<ul style="list-style-type: none"> • May re-stabilize ecosystem 	<ul style="list-style-type: none"> • May require permits • May not be accepted by the public • Risk causing negative ecological changes • Requires in-depth knowledge of ecology and zoology
Hunting/culling	<ul style="list-style-type: none"> • Low-cost, if public allowed or recruited to hunt. • Most prevalently applied type of population control strategy 	<ul style="list-style-type: none"> • May not be accepted by the public • Limited to species not protected by federal or state regulation • Requires population estimate surveys • Long-term commitment must be made to this strategy
Wildlife Corridors	<ul style="list-style-type: none"> • Disperses population • Provides opportunity to move wildlife from riparian buffers 	<ul style="list-style-type: none"> • Cost

Table 4-1: Potential Strategies for Pollutant Sources of Interest

POLLUTANT SOURCE: ALTERED HYDROLOGY		
Type of Project	Pros	Cons
Regional Pond	<ul style="list-style-type: none"> • Effective treatment for fecal coliform • Treats a large area • Scalable • Can be an amenity • Can increase detention time/reduce pollutant loading 	<ul style="list-style-type: none"> • Requires a large area • Can affect several property owners • Access • Long-term maintenance • High initial cost • Increased liability for landowner • Does not reduce runoff volumes
Wetland Restoration/ Retrofit Ditching	<ul style="list-style-type: none"> • Reduces velocity • Increases holding time • Reduces re-suspension of sediment/fecal coliform 	<ul style="list-style-type: none"> • Need to obtain easements • Possible high initial cost • Requires multiple permits • Can affect developed area tailwater and increase flooding
Retrofit lagoons/ ponds	<ul style="list-style-type: none"> • Can increase detention time/reduce pollutant loading • Limit flushing wetlands • Fairly low construction cost 	<ul style="list-style-type: none"> • Need to obtain easements • High design cost • O&M expenses • Does not reduce runoff volumes
Incentives to encourage LID/retrofits	<ul style="list-style-type: none"> • Provides volume control and pollutant load reductions • More involvement from private community in maintaining/managing controls • Encourages land donation/trade from private land developers/commercial properties (i.e. allow the use of their land for LID features, paid for by the Town or in exchange for a user fee reduction). • Encourages higher standard of maintenance and management of stormwater controls by those living in the private community 	<ul style="list-style-type: none"> • Need support from developers, contractors, and property owners • Lack of knowledge of LID techniques • Reluctance of designers/developers for liability of newer technology/concepts • Cost of incentives to Town/County • Long Term O&M expenses

Table 4-1: Potential Strategies for Pollutant Sources of Interest

POLLUTANT SOURCE: ALTERED HYDROLOGY		
Type of Project	Pros	Cons
Runoff Reduction (e.g. pervious pavement, rainwater and stormwater harvesting)	<ul style="list-style-type: none"> • Reduce runoff volume • Reduce pollutant loading from runoff • Reduce use/cost of treated water bill • Upgrades can be incorporated during maintenance efforts 	<ul style="list-style-type: none"> • Must entice public to cooperate • May increase maintenance burden and installation cost • Harvesting is not as reliable a source of water as public or well water
Design Storm Recommendations / Alternative Design Storms	<ul style="list-style-type: none"> • Increase water quality • Reduce erosion • Allow for increased regulation of site discharges 	<ul style="list-style-type: none"> • Code / ordinance update and adoption • Plan review enforcement

Table 4-1: Potential Strategies for Pollutant Sources of Interest

POLLUTANT SOURCE: VARYING		
Type of Project	Pros	Cons
Education	<ul style="list-style-type: none"> • Relatively inexpensive • Effective when public cooperates 	<ul style="list-style-type: none"> • Must entice public to cooperate
Horse Manure Management & BMPs	<ul style="list-style-type: none"> • Effective reduction in fecal coliform 	<ul style="list-style-type: none"> • Must get horse farm owners to cooperate
Individual homeowner BMPs	<ul style="list-style-type: none"> • Reduce failing septic systems • Reduce stormwater leaving lots 	<ul style="list-style-type: none"> • Expensive • Must get homeowner to cooperate
Unified Development Ordinance Amendments	<ul style="list-style-type: none"> • Wide-spread implementation which could increase overall pollutant load reduction • Allow for enforcement/earlier action from Town 	<ul style="list-style-type: none"> • Effective only for new construction • Increase new construction costs
Land Acquisition	<ul style="list-style-type: none"> • Protect land from development • Provide wildlife habitat/corridors 	<ul style="list-style-type: none"> • Cost
Development Agreements/ Incentives	<ul style="list-style-type: none"> • Low Cost • Requires limited resources • Preventative measure 	<ul style="list-style-type: none"> • Need support from developers, contractors, and property owners • Feasibility of enforcement • Cost of incentives to Town/County
Transfer of Development Rights	<ul style="list-style-type: none"> • Protect land from development • Preventative measure • Provide wildlife habitat/corridors 	<ul style="list-style-type: none"> • Cost (or banking mechanism) • Requires coordination and negotiations • Need support from developers and land owners
Solar Aerators for existing ponds	<ul style="list-style-type: none"> • Increase “treatment” ability of pond • Low maintenance requirement 	<ul style="list-style-type: none"> • Must get property owner to cooperate • Upfront cost

Risks to Implementation

- ✓ Cost above available budget
- ✓ Need for additional private area/access
- ✓ Negative public perception
- ✓ Wetland impacts/permitting
- ✓ Property owner willingness to participate
- ✓ Feasibility and responsibility for long-term maintenance and effective operations.
- ✓ Liability (real or perceived) for anticipated performance (efficiency removal) for new LID techniques that may not be fully defined in the Town codes and specifications and are being implemented as pilot projects

4.3.3 Prioritizing of Non-Structural Projects

The prioritization process described above can also be applied to non-structural projects. In general, non-structural projects do not have as many physical requirements and are therefore easier to prioritize (but not necessarily easier to implement). The below list of generalized prioritization criteria and risks to implementation were used to identify which non-structural projects would be a best fit for potential public projects. Likewise, these below risk factors were not factored into the project recommendations as negative impacts (i.e. no projects were eliminated due to jurisdiction, etc.). It is recommended in the future analysis that these risks be evaluated appropriately (i.e., efficient projects that will provide substantial improved water quality in critical areas should not be eliminated due to public participation, etc.).

Prioritization Criteria

- ✓ Effectiveness of BMP
- ✓ Water quality in adjacent sampling points
- ✓ Ease and cost of implementation
- ✓ Partnering opportunities
- ✓ Ability to compliment local culture

Risks to Implementation

- ✓ Public Participation
- ✓ Public Opposition
- ✓ Jurisdiction
- ✓ Ordinance/regulations
- ✓ Property Owner Association covenants and restrictions

4.3.4 Identification of Specific Projects for Retrofit

Specific areas for implementing potential projects were identified using the hotspots and target areas developed in Section 4.2.2 - Hot Spot Identification and Targeted Retrofits. These areas are shown on Map 7 in Appendix D and are described in the below matrices. Specific projects

that could be implemented for each project area were determined based on the feasibility for that project. Factors that were considered included:

- ✓ hydrology,
- ✓ proximity to the May River,
- ✓ available area,
- ✓ type of area (developed vs. undeveloped),
- ✓ level of fecal coliform,
- ✓ new residential development with regional BMPs and connections to utilities (availability of sanitary sewer connections, capability to implement “purple-pipe” reuse infrastructure),
- ✓ residential development with “grandfathered” stormwater controls,
- ✓ older residential with septic,
- ✓ undeveloped land with or without planned development, and
- ✓ buffer requirements.

The following tables provide a summary of the newly conceived projects, general project types, and the latest Town planned projects that provide water quality benefits, and are to be implemented as “public projects.” The stormwater aspects that can be implemented into the Town’s existing projects are shown on Map 7 in Appendix D.

Matrix – Based on the feasibility, the following potential projects were identified. The prioritization process explained in Section 4.3.2 - Prioritizing of Structural Projects in Need of Retrofit, and 4.3.3 - Prioritizing of Non-Structural Projects, should be used to rank the potential projects and develop an implementation schedule. More detailed feasibility studies should be conducted as dictated by the implementation schedule.

NEW STORMWATER PROJECT CONCEPTS

The below table presents the recommended BMPs that could be implemented throughout the watershed to improve fecal coliform levels within the May River. The implementation strategy for these items is generally the same, and has been described below as the General Plan. This General Plan includes:

1. Approaching the land owner for participation
2. Performing a detailed review of surrounding infrastructure for implementation
3. Proceeding to design, permitting and construction phases

These areas are detailed on Map 7 in Appendix D:

Table 4-2 Recommended BMPs		
Type of Project	Justification (Why is this project beneficial?)	Implementation Strategy
Area A – Future New Riverside area		
Construct Three New Stormwater Ponds, Modify One Existing Stormwater Pond	<ul style="list-style-type: none"> • Open Space • Location and Proximity to May River • High fecal coliform numbers of Adjacent Water Quality Station • BMP Effectiveness 	General Plan
Area B – Kenzie Park Outfall		
Construct new stormwater pond	<ul style="list-style-type: none"> • Open Space • BMP effectiveness 	General Plan
Area C – Rose Dhu Creek		
Construct one new stormwater pond	<ul style="list-style-type: none"> • High fecal coliform numbers of Adjacent Water Quality Station • BMP Effectiveness • High Feasibility • Cost higher because of existing lots 	General Plan
Area D – Between Buckwalter Community Park and The Farm		
Construct ditch modifications in existing ditch to divert water into adjacent ponds/wetland restoration	<ul style="list-style-type: none"> • BMP effectiveness / Increase residence time/water quality • Ease of Implementation • Cost versus BMP effectiveness • Open Space 	General Plan
Area E – Ditch north of Stoney Crest (or similar)		
Construct earthen ditch blocks in existing	<ul style="list-style-type: none"> • Location of project • Ease of implementation 	General Plan

MAY RIVER WATERSHED ACTION PLAN
NOVEMBER 1, 2011

Table 4-2 Recommended BMPs		
Type of Project	Justification (Why is this project beneficial?)	Implementation Strategy
ditch/wetland restoration	<ul style="list-style-type: none"> • Open Space • Adjacent impairment of water quality stations • Value of BMP / cost vs. effectiveness 	
Area F – Hampton Lake Retrofit		
Pond modification	<ul style="list-style-type: none"> • Location / potential affected basin • Open Space 	General Plan
Area G – Lakepoint Drive		
Pond modifications for up to nine existing stormwater ponds	<ul style="list-style-type: none"> • Open Space around a portion of the ponds • Location/potential affected basin • BMP effectiveness 	General Plan
Area H - Pinecrest		
Modify five stormwater ponds	<ul style="list-style-type: none"> • Open Space 	General Plan
Area I – Pinecrest		
Modify three existing stormwater ponds	<ul style="list-style-type: none"> • Open Space • BMP effectiveness 	General Plan
Area J – Town Property		
Expand existing Town stormwater pond	<ul style="list-style-type: none"> • Open Space • BMP effectiveness • Ease of implementation 	General Plan
Area K – Guerrard/Wharf Street		
Modify existing pond/construct two new stormwater ponds	<ul style="list-style-type: none"> • BMP effectiveness • Not sure where these ponds are or if there is space for them 	General Plan
Area L – Gascione Bluff		
Construct Four New Stormwater Ponds	<ul style="list-style-type: none"> • Open Space • High fecal coliform numbers of Adjacent Water Quality Station • Location and proximity to May River • Cost versus BMP effectiveness • High Feasibility 	General Plan
Area M – Traver Tract		
Modify three existing ponds	<ul style="list-style-type: none"> • Open Space • Location 	General Plan

MAY RIVER WATERSHED ACTION PLAN
NOVEMBER 1, 2011

Table 4-2 Recommended BMPs

Type of Project	Justification (Why is this project beneficial?)	Implementation Strategy
Area N – Ditch in Hampton Lake		
Construct earthen ditch blocks in existing ditch/wetland restoration	<ul style="list-style-type: none"> • Ease of implementation • Open Space • Value of BMP / cost vs. effectiveness 	General Plan

Table 4-3: GENERAL STORMWATER PROJECT CONCEPTS

The below projects represent projects that could be implemented throughout existing Town facilities:

Project Area	Type of Project	Justification (Why is this project beneficial?)	Implementation Strategy
Oscar Frazier Community Park	Pet Waste Management	<ul style="list-style-type: none"> • Increased participation/ high visibility for targeted participants (dog owners) • Low cost • Ease of implementation 	Combine pet waste stations with an education element to encourage continued behavior in other areas
	Vegetated swales and rain gardens	<ul style="list-style-type: none"> • Low cost • Ease of implementation • Open Space • High visibility for targeted future participants 	Add an education element to encourage implementation in other areas
	Additional pervious pavement	<ul style="list-style-type: none"> • Can be cost-beneficial compared to current pavement • Can be upgraded in conjunction with maintenance efforts 	Implement in conjunction with maintenance effort and budget for event parking
	Raintank	<ul style="list-style-type: none"> • Stores and infiltrates runoff from the road 	Look for suitable location to assess general feasibility
General Town & County Facilities (e.g. schools, library, fire department, parks)	Rain gardens	<ul style="list-style-type: none"> • Low cost • Ease of implementation • Open Space • High visibility for targeted future participants 	Add an education element to encourage implementation in other areas
	Rain barrels & cistern	<ul style="list-style-type: none"> • Low cost • Reduces runoff while providing a needed water source for irrigation & maintenance 	Add an education element to encourage implementation in other areas

- High visibility for targeted future participants

Table 4-3: GENERAL STORMWATER PROJECT CONCEPTS

The below projects represent projects that could be implemented throughout existing Town facilities:

Project Area	Type of Project	Justification (Why is this project beneficial?)	Implementation Strategy
		by example	
	Pervious pavement	<ul style="list-style-type: none"> • Can be cost-beneficial compared to current pavement • Can be upgraded in conjunction with maintenance efforts 	Implement in conjunction with maintenance effort and budget
	Disconnect rain downspouts from storm drains	<ul style="list-style-type: none"> • Ease of implementation 	Need to determine if surrounding area can support infiltration; or implement in conjunction with rain barrels
	Native Vegetation	<ul style="list-style-type: none"> • Materials are available • Reduces pesticide & fertilizer usage • Reduces irrigation need 	
Road BMPs (partner with DOT)	Retrofit medians and swales to increase perviousness	<ul style="list-style-type: none"> • Open Space • Partnering opportunity • Low cost - simple design • High visibility 	Approach DOT for partnering opportunity; Can be done in conjunction with road improvement projects

Table 4-4: PROJECTS INCLUDED IN CURRENT (FY 2012) TOWN PLAN

The below projects represent projects that could be implemented into projects that are already budgeted for FY2012.

Project Name	Project Description	Justification (Why is the project beneficial?)	Implementation Strategy
DuBois Park	Master Plan to include LID	<ul style="list-style-type: none"> • Project in early stages with public input • Land, funding and design addressed through other project objectives • Runoff reduction and other LID elements demonstrated 	Make this part of the communication and marketing campaign; work with planning and designer teams to ensure LID elements are included
Pathways	Extending Town pathways	<ul style="list-style-type: none"> • Open Space • Partnering opportunity • Low cost - simple design • High visibility 	Look for opportunities to use alternative parking surfaces – paths are mulched, but will need parking lots
Bruin Road Land Acquisition	Streetscape - LID	<ul style="list-style-type: none"> • Conceived and funded • Visible • Demonstration & Outreach opportunities 	Promote the greener elements of the project; look for opportunities to apply techniques to other roadway projects
Town Hall Municipal Court	Concept Plan for Facility	<ul style="list-style-type: none"> • Conceived • High visibility • Demonstration & Outreach opportunities 	Find runoff reducing techniques, and develop procedures for incorporating them into all municipal facility designs
Wharf Street Redevelopment / Affordable Housing	Construction of Green Cottages	<ul style="list-style-type: none"> • Conceived and funded • Open Space • Partnering opportunity • Low cost - simple design • High visibility • Demonstration & Outreach 	<p>Use this completed project to illustrate how others can do this as a private initiative</p> <p>New stormwater volume ordinance was adhered to through LID techniques</p>

Table 4-5: PROJECTS FOR NEWER NEIGHBORHOOD DEVELOPMENTS

The below projects are projects that could be incorporated into specific existing neighborhoods

More recent residential development The Farm at Buckwalter; Hampton Hall; Hampton Lakes and Rose Dhu Creek Plantation		
Type of Project	Justification (Why is this project beneficial?)	Implementation Strategy
Pond retrofit	<ul style="list-style-type: none"> • Volume controls would be more effective in upland areas • Ability to improve performance of existing pond 	Approach HOA for participation; modify maintenance agreement if appropriate; cost-sharing for retrofit
Wildlife controls	<ul style="list-style-type: none"> • Low cost • Ease of implementation • Addresses a nuisance problem in addition to a water quality issue 	Add an education element to encourage participation
Rainwater Harvesting	<ul style="list-style-type: none"> • Volume controls would be more effective in upland areas • Depending on implementation, can have a low cost for a high return • Reduces runoff while providing a needed water source for irrigation & maintenance • Can implement on a case by case basis 	Provide cost-sharing and education programs for rain barrels and irrigation systems from ponds
Pet Waste Stations /Other Pet Waste Programs	<ul style="list-style-type: none"> • Relatively low installation cost • Ease of implementation 	Determine who is responsible for maintenance; implement waste stations

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Table 4-6: PROJECTS FOR OLDER NEIGHBORHOOD DEVELOPMENTS

The below projects are projects that could be incorporated into specific existing neighborhoods

Older residential development Gascoigne Bluff; May River Plantation		
Type of Project	Justification (Why is this project beneficial?)	Implementation Strategy based on Prioritization Rankings
Wildlife controls	<ul style="list-style-type: none"> • Low cost • Ease of implementation • Addresses a nuisance problem in addition to a water quality issue 	Add an education element to encourage participation
Septic Programs	<ul style="list-style-type: none"> • Direct source reduction • Can address homeowner need in addition to water quality issue • Can regulate inspections to determine effectiveness of systems • Can regulate maintenance practices and standards to determine when repairs and improvements are required 	Can work with septic provider to implement incentives, such as free inspections.
Rainwater Harvesting	<ul style="list-style-type: none"> • Depending on implementation, can have a low cost for a high return • Reduces runoff while providing a needed water source for irrigation & maintenance • Can implement on a case by case basis 	Provide cost-sharing and education programs for rain barrels and irrigation systems from ponds
Regional Ponds	<ul style="list-style-type: none"> • Proximity to May River provides greater benefit for pollutant reduction • Could offer amenity to community 	Approach land owner for participation; detailed review of surrounding infrastructure for implementation as well as determination of overall affected basin; proceed to design, permitting and construction phases
Retrofit Ditches	<ul style="list-style-type: none"> • Because of location and extent in the watershed, greater potential for pollutant reduction 	Determine permitting requirements; Approach land owner for participation; detailed review of surrounding topography / infrastructure for implementation and definitive basin affected; proceed to design, permitting and construction phases

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Older residential development Gascoigne Bluff; May River Plantation		
Type of Project	Justification (Why is this project beneficial?)	Implementation Strategy based on Prioritization Rankings
End-of-pipe retrofits	<ul style="list-style-type: none"> • Limited land requirement • Low visibility to general community 	Approach land owner for participation; proceed to design, permitting and construction phases
Pet Waste Stations /Other Pet Waste Programs	<ul style="list-style-type: none"> • Relatively low installation cost • Ease of implementation 	Determine who is responsible for maintenance; implement waste stations
Wetland Retrofit	<ul style="list-style-type: none"> • More available area to increase holding volume and detention time for wetlands • Proximity to May River 	Determine permitting requirements; Approach land owner for participation; proceed to design and permitting.

Table 4-7: PROJECT DEVELOPMENT IN ALL NEIGHBORHOODS

The below projects represent projects that can be incorporated into any neighborhood development.

All Neighborhoods		
Type of Project	Justification (Why is this project beneficial?)	Implementation Strategy
Promote water conservation practices	<ul style="list-style-type: none"> This will reduce the amount of surface water generated, thereby reducing overall runoff and fecal loading 	Create / distribute education promotions demonstrating the value of water conservation, with practical applications for implementations
Provide community education for pet waste pick up	<ul style="list-style-type: none"> This will reduce the loading generated from the residential landuses 	Meet with HOA/subdivisions; discuss how to best implement in each specific neighborhood (locations of pet waste stations); provide maintenance strategies for HOAs to maintain/clean stations
Promote individual LID projects, such as rain barrels and rain gardens on residential lots	<ul style="list-style-type: none"> This will reduce the amount of surface water generated, thereby reducing overall runoff and pollutant loading 	Hold information sessions hosted within each neighborhood to educate the community on the value of these items, where they can purchase, and how they can implement.
Hold Stakeholder meetings to encourage Homeowners Associations to periodically and consistently review regulations and promote new regulations.	<ul style="list-style-type: none"> This will provide an opportunity to update each community on the status of the watershed, and remind them of the importance of taking action 	Hold regularly scheduled information sessions for all HOA representatives to attend, where they can share ideas between HOAs of implemented programs that are working, and the Town can provide feedback towards the status of the watershed.

Table 4-8: REVIEW/UPDATE DEVELOPMENT POLICIES

The below projects are items that should be reviewed for update in Town’s development policies and ordinances

Type of Project	Justification (Why is this project beneficial?)	Implementation Strategy
Include a temporal clearing guide, that requires construction milestones within a specific timeframe from site clearing	<ul style="list-style-type: none"> This will allow for bare sites with no stabilization to be regulated to avoid sites being cut and then sitting for years until the developer proceeds with the construction. 	Review existing ordinances for implementation
Reduce overall imperviousness by implementing pervious pavement	<ul style="list-style-type: none"> This will allow for additional pervious areas, which will reduce the overall site runoff 	Review existing ordinances for implementation
Promote implementation of stormwater harvesting	<ul style="list-style-type: none"> This will reduce the overall runoff, thereby increasing the water quality 	Review existing ordinances for implementation
Coordinate with developers and land owners to promote transfer or purchase of development rights transactions	<ul style="list-style-type: none"> This will allow for more land to remain in its natural state, reducing the amount of future runoff and pollutants generated 	Review existing approved planned developments and development agreements for sunset dates; Discuss with land-owners and developers; Use as part of PUD renegotiations; Consider using Town funds to purchase credits more aggressively when there are no buyers.

4.4 Timeline of Implementation Schedule

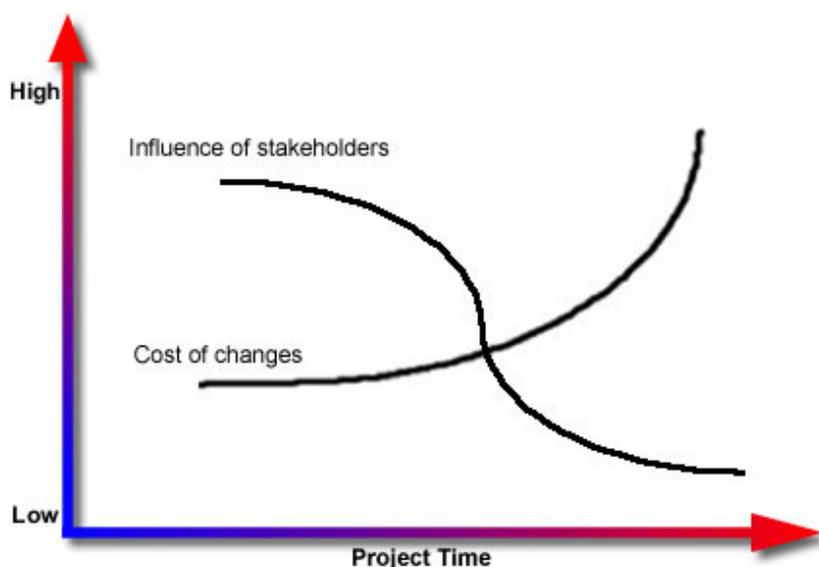
A timeline is provided so the short-, medium-, and long-term solutions will have some measure of success (or progress), while allowing for the local, regional, county, state and Federal government to assess and assign priorities. All projects and programs have been included based on their technical merit. The timeline for implementation is based on the complexity of their implementation. In some cases it is due to their scale, which can require more lead time for partners, funding, and land needs. In other cases it is based to the need to validate their anticipated performance through more field monitoring and/or modeling. Lastly, the timeline for a particular project can be affected by the logistics of Town projects planned/initiated prior to this Action Plan which can serve the goals of the May River.

The May River Watershed Action Plan will have a phased implementation focusing on:

- ✓ Short-term projects/programs in Phase I (year 1 – 3 of plan implementation),
- ✓ Medium-term projects/programs in Phase II (years 3 – 5),
- ✓ Long-term projects/programs in Phase III and Phase IV (years 5+),

It is expected that Phases I through II of this plan will take 5 years to implement. Phases III and IV include long-term implementation of policies and projects which may have been planned and initiated in earlier phases but require more than 5 years to complete and assess the impacts.

Timeframe priorities are also based on the fact that the cost of changes is lowest and the influence of stakeholders the highest at the beginning of a project, while the cost is highest and influence of stakeholders is lowest at the end of the project. In other words, by taking the time to reach out to the potential stakeholders of a project in the earliest of stages, the project is most likely to have their support during the actual implementation. Furthermore, in doing so, the increased costs of the later phases of project development will not be at risk due to the time that was invested to communicate the goals of the project early on. This applies to all three primary project types (public, public-private and private). However, structural BMP projects, such as new or modified ponds, will be associated with greater costs than the programmatic projects such as septic tank maintenance and the adoption of Low Impact Development techniques.



The May River Watershed Action Plan should have a phased implementation schedule as follows:

- ✓ Phase I – Phase I includes this watershed plan and short-term actions that have already been initiated or scheduled within the first three years of implementation (e.g. impervious study, 319-project).
- ✓ Phase II – Phase II includes projects and actions that can be planned, initiated, and implemented within the next 5 years. These projects may not have approved funding sources yet. These actions may include policy and regulatory changes that will require a longer timeline and more stakeholder involvement for full implementation. These policy and regulatory changes may be planned and initiated in Phase I but full implementation will not be complete until Phase II.
- ✓ Phase III – Phase III will include projects and actions that will continue implementation beyond the five years from plan implementation. As with Phase II, these actions may include policy and regulatory changes that will require a longer timeline and more stakeholder involvement for full implementation. These policy and regulatory changes may be planned and initiated in earlier phases but full implementation will not be complete until Phase III. This phase will also include long-term monitoring and evaluation of the implemented BMPs.
- ✓ Phase IV – Phase IV will include long-term projects and actions that will continue implementation beyond the eight years from plan implementation. These actions may include policy and regulatory changes or projects that will require a longer lead time for planning and more stakeholder involvement for full implementation. Activities may be planned and initiated in earlier phases but full implementation will not be

complete until Phase IV. This phase will also include long-term monitoring and evaluation of the implemented BMPs.

In recognizing and understanding the factors that influence the priority of a particular recommendation within this Action Plan, the timeframe of action items (projects, policies, and programs) is provided in the table below. The details of each (description, partnering and funding options, cost etc.) can be found in the preceding sections.

It is recognized that the May River Watershed Action Plan is a dynamic and ever-evolving document that will be updated and refined as new and better information becomes available. Therefore, it is understood that the timeframe associated with a deliverable may change based upon new information or a change of scope within a deliverable. These changes are healthy and necessary for a successful plan and will reflect our greater understanding of the complex and unique ecosystem of the May River.

NOTE: Action Items with an asterisk () are recommended for discussion and planning in the short- to medium-term, but will be implemented on their full-scale over the long-term.*

Table 4-9: PHASE I IMPLEMENTATION SCHEDULE

Action Items	Status
Create Impervious Surface Map	Complete
Final SCDHEC 319 Grant Report	In Progress
RV / Campground Waste Management Plan	Complete
Rain Barrel/Rain Garden Program	Complete
Pet Waste Stations	Complete
Social Marketing Campaign	In Progress
Delineate May River Watershed	In Progress
Unified Development Ordinance Overhaul	In Progress
Pilot Projects	In Progress
Construction Site Inspection Program	In Progress
Ditch Enhancement / Erosion Prevention	In Progress
Transfer of Development Rights Program	In Progress
*Develop Model to Predict Fecal Coliform, stormwater volume, and other indicators	Short-term

Table 4-10: PHASE II IMPLEMENTATION SCHEDULE

Action Items	Timeframe
Look to incorporate in FY 2012 Town Projects: Converting septic service to sewer service	In Progress and Short- to Medium-term
Look to incorporate in FY 2012 Town Projects: Implementing the use of pervious surfaces, such as concrete for sidewalks, pavement for parking lots, roadways, driveways, etc.	In Progress and Short- to Medium-term
Look to incorporate in FY 2012 Town Projects: Increase education through the communication and marketing plan to make citizens aware of the Town's projects and their goals, including water quality	In Progress and Short- to Medium-term
Look to incorporate in FY 2012 Town Projects: Implement runoff reduction techniques in new projects, such as recreational areas	In Progress and Short- to Medium-term
Look to incorporate in FY 2012 Town Projects: Incorporate runoff reduction techniques, such as landscaped medians that have a dual use for bioretention/detention, on roadway/streetscape projects	In Progress and Short- to Medium-term
Bird Roosting Deterrent	Short-term
Area A – Construct New Stormwater Ponds and Modify Existing Pond	Short- to Medium-term
Area B – Construct New Stormwater Pond	Short- to Medium-term
Area C – Construct New Stormwater Pond	Short- to Medium-term
Area D – Modify Existing Ditch and Adjacent Ponds	Short- to Medium-term
Area E - Construct Earthen Ditch Blocks	Short- to Medium-term
Sensitive Areas Determination	Medium-term
319 Program Septic System Inspections / Pump Outs	In Progress
319 Program Septic System Up-Grades / Replacements	In Progress

Table 4-10: PHASE II IMPLEMENTATION SCHEDULE

Action Items	Timeframe
Manure Management Plan	Medium-term
*Communications / Marketing Plan	Short- through Long-term
Survey and Analysis to better understand contribution of septic systems	Medium-term
Septic Inspection/Maintenance Program	In Progress
Septic System Cleaning Incentive Program	Medium-term
Septic System Education Program	Medium-term
*Wildlife Management Plan	Medium-term to Long-term
Coordinate with land owners, developers and legal counsel regarding Transfer of Development Rights	In Progress/Short-term