Yellow Bank Creek
Watershed Management Plan

A Sub-Watershed Supplement
to the
Flint River Watershed Management Plan

Watershed Plan Facilitation
and Project Contact

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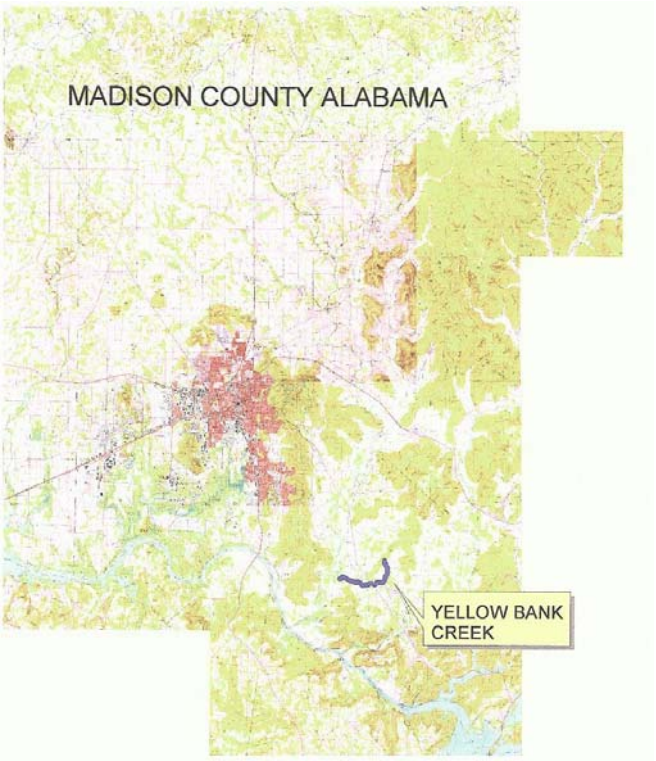
Introduction

The Yellow Bank Creek Watershed lies within the Tennessee River Basin and is part of the Wheeler Lake Watershed (USGS hydrologic cataloging unit AL-06030002; and the NRCS 210 Lower Flint River watershed). The watershed is wholly located in Madison County, near the community of New Hope, approximately 20 miles SE of Huntsville (SW1/4 Section 27, Township 5S, Range 2E). The watershed has a drainage area of 9.27 square miles (6,208 acres). Its designated water use classification is Fish and Wildlife.



The State of Alabama identified Yellow Bank Creek on the 1998, 2000, 2002, and draft 2004 Clean Water Act Section 303(d) List of Impaired Waters. It is only partially supporting its Fish and Wildlife Water Use Classification [Alabama Department of Environmental Management (ADEM) Admin. Code R. 335-6-10-.09(5)(a-d). Yellow Bank Creek is a tributary of the Flint River and is impaired a linear distance of 5.6 stream miles, from its source to its discharge into Flint River.

The Total Maximum Daily Load (TMDL) cause of water quality impairment is organic enrichment/low dissolved oxygen. The TMDL pollutant of concern is Organic Enrichment (OE). The Alabama Water Quality Standard violation is dissolved oxygen (DO). The TMDL sources of impairment are agriculture and urban runoff/storm sewers. There are no contributing National Pollutant Discharge Elimination System (NPDES) point sources in the watershed.

Average annual precipitation in the watershed is about 54 in/yr. The 7Q10 stream flow (minimum 7-day flow that occurs on average over a 10-year recurrence interval) is about 0.16-cfs at the mouth of Yellow Bank Creek. During the winter and spring, the creek generally has a steady flow. However, during the dry summer season, the stream flow is little or none (0-0.5 fps). Often times, the only water may be occasional pooled area in the creek bed. Organic enrichment and dissolved oxygen impairments are driven by low stream flows and high temperatures that often occur during the hot, dry, summer months.

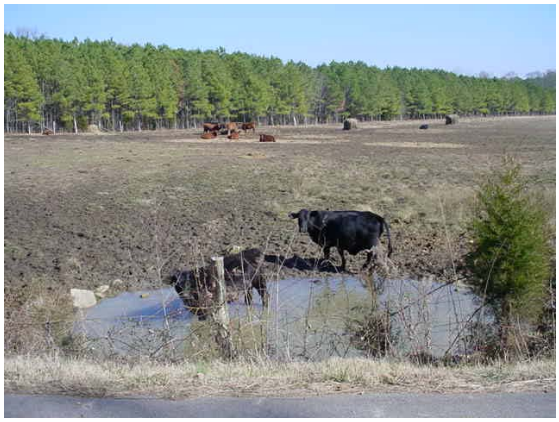
Yellow Bank has a wide floodplain in the upper watershed surrounded by hilly, forested land. Much of the original drainage has been disrupted as a result of decades-past stream-channelization efforts. Most of the fields in the floodplain have been ditched, and in years past, were natural wetlands. The lower portion of the watershed is mainly rolling and more developed, with a narrow floodplain that is prone to flooding.

The USGS National Land Cover Database Land cover indicates the Yellow Bank Watershed to be dominated by forested lands (59%); row cops (23%); pasture/hay fields (16%); small areas of low intensity residential (1.5%); and other (<1%).

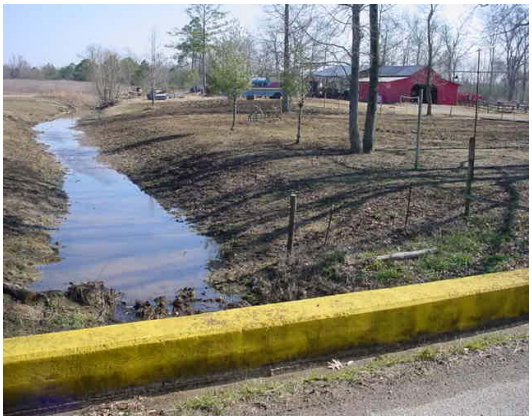
Farm size averages about 150 acres. According to the Madison County Soil and Water Conservation District Watershed Assessment (1998), livestock (measured as Animal Unit (AU) concentrations) in the lower Flint River watershed is 0.13 AU/acre (Cattle = 0.12 AU; Swine = 0.01 AU). There are no concentrated animal feed operations in the watershed; however, some pastured livestock have unrestricted access to the creek.

NPS runoff potential is affected as much by land use, as soil type. Conventional cropping systems in the watershed result in an average soil loss of 6-7 tons/acre/year - which exceeds the tolerance level (T) for all soil types in the watershed. The major soils in the watershed are Hollywood (Hr) and Holston (Ht) on 0-2% slopes. Theses soils are productive, cultivatable, and intensively farm lands producing corn, soybeans, and cotton for decades. The forested area soil types are Melvin (Me), a hydric soil, and Rockland (Rr). Natural vegetation on these soils is transitional mixed mesophytic forest (oak-hickory). Capshaw (Ca) soils (2-6% slopes) are found in the lower part of the watershed. These soils are highly erodable and are primarily used for pastureland, hayland, and livestock production.

Excessive sediment and organic pollutants are entering waterways from agricultural sources. The creek is a primary watering source for livestock (primarily cattle and horses), and in some cases, cattle have direct and unrestricted access to the creek. Many pastures are not properly managed. Pasture vegetation quality is generally poor due to overgrazing, and the use of grazing systems or fertility programs in the watershed is uncommon. A lack of constructed stream crossings for livestock also contributes to organic loading, streambank erosion, habitat destruction, and sedimentation. Some watershed pollutants not addressed by the TMDL to data may be associated with pathogens from failing septage treatment systems or other sources such as domestic pets and wildlife.

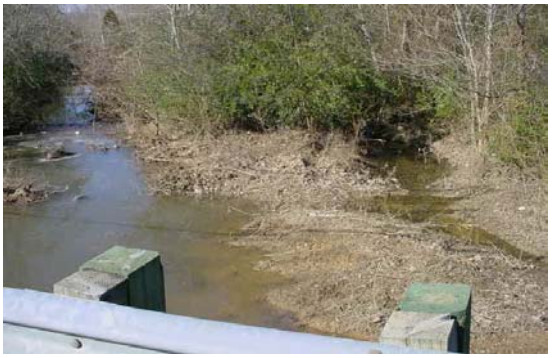


Livestock in spring head on a tributary. Pasture is over grazed and erodable.



Livestock have unrestricted access to creek. Vegetation and buffers are non-existent

Typical view of cropland in the watershed.



Sediment loading and steam bank erosion

Pesticides are applied to about 24% of the watershed/year (about 1,860 acres). Conservation plans will be developed on about 1,500 acres of cropland and 250 acres of pastureland to address pesticide use and management. The NRCS Win-Pest program will be used to predict current possible problems farm by farm in order to recommend, a) alternative or more environmentally sensitive chemicals, and b) setback and buffers near streams.

Urban growth (generally moving from the Huntsville area) continues to place developmental pressure on the watershed. Increases in population continue to threaten the watershed with additions of conventional housing, mobile homes, and a few businesses. Septic tanks and field line are commonly used to dispose of household septage throughout the watershed. However, soils are generally not suitable for conventional septic tanks or field lines because the soils are relatively clayey and infiltration rates are often slow. In addition, much of the Yellow Bank Watershed has a high groundwater table.

Historical evidence suggests that Native Americans camped and lived near the mouth of Yellow Bank Creek and Flint River. Endangered species such as bald eagles have been sighted nesting in the area, as well as red-cockaded woodpeckers. Turkey and quail populations are low in the watershed; however, deer, rabbit, and squirrel are well established.

Watershed Management Plan Goal

The goal of the Yellow Bank Creek Management Plan is to reduce the cumulative effects of nonpoint source (NPS) polluted runoff in order to enable the watershed to meet or exceed state water quality standards and criteria for a Fish and Wildlife water use classification. In order to accomplish this goal, TMDL pollutant causes and sources will be addressed through development and implementation of farm conservation plans. Best Management Practices (BMPs) will be recommended to reduce NPS pollutant loads by 61.6% in order to remove Yellow Bank Creek from the 1998 and 2000 Section 303(d) list of impaired waters.

Although the TMDL cause of impairments for Yellow Bank Creek is listed as "*organic enrichment / dissolved oxygen,*" this management plan seeks to directly address nutrients and sediment since these nonpoint sources are the primary pollutants in the watershed. This management plan is designed to focus federal, state, and local funding and efforts to resolving predominantly rural-based NPS problems. It is developed, and will be implemented, using a cooperative stakeholder approach to maintain, improve, and protect the physical, chemical, biological, and habitat conditions throughout the watershed.

Several stakeholder meetings, correspondence, watershed tours, and draft management plan iterations were conducted in order to produce this document. The Madison County Soil and Water Conservation District

and the TVA Pickwick-Wheeler Watershed Team were instrumental in initiating development of this plan and assuming local leadership in facilitating stakeholder interest with entities such as the Madison County Watershed Advisory Committee, Flint River Conservation Association, and the Alabama Clean Water Partnership.

This plan is a living document. Copies/updates will be made available to the public from the Tennessee Valley Clean Water Partnership; Madison County Soil and Water Conservation District Office (Huntsville); or ADEM (Montgomery NPS Unit). Stakeholder recommendations and comments are encouraged on a continuous basis. Stakeholders may provide feedback to the Watershed Project Coordinator and the Madison County Soil and Water Conservation District. It is expected that some management plan recommendations and/or implementation efforts may be revised over time as additional data and information is received; new or improved technical/technology and funding resources become available; or as stakeholder input, concerns, or priorities dictate.

Implementation of this plan builds upon initiatives already established or underway in the larger Section 303(d) impaired Flint River Watershed in the Tennessee Valley. For example, since the late 1990s, the Flint River Conservation Association, Madison County Soil and Water Conservation District, Natural Resources Conservation Service, Madison County Watershed Advisory Committee, Tennessee Valley Authority, Alabama Department of Environmental Management, Tennessee Valley Resources Conservation and Development Council (now the Alabama Mountains, Rivers and Valleys RC&D), Madison County, City of Huntsville, Clean Water Partnership, Public Health Department, local citizen groups, and others have been actively working with landowners and users in the Flint River Watershed with the goal of improving water quality. Watershed protection funding from the Alabama Soil and Water Conservation Committee's agricultural cost-share program, the federal Environmental Quality Incentives Program (EQIP), Conservation Reserve Program (CRP), Wildlife Habitat Incentives Program (WHIP), and Clean Water Act Section 319, have already been expended in the Flint River Watershed. However, the Watershed Advisory Committee, composed of representatives of several of the entities listed above, is now focused on addressing more *specific* impaired subwatersheds in the Flint River Watershed - including the Yellow Bank Creek Watershed. In response to the development of a TMDL for Yellow Bank Creek, this plan was developed to better focus limited watershed restoration resources to address specific water quality problems using a targeted TMDL pollutant cause and source BMP implementation approach.

Nonpoint Source Pollutant Causes and Sources

Stakeholder Concerns:	Impaired water quality Accelerated streambank, cropland, and pastureland erosion Loss of streambank stabilizing vegetation and stream shading Disturbed riparian areas and habitat; impaired aquatic organism survival Head cutting in the upper part of the watershed
Section 303(d) Cause:	Organic enrichment/low dissolved oxygen
Section 303(d) Source:	Agriculture Urban runoff/storm sewer

A. Siltation: The primary sources of agricultural pollutants are associated with poor quality pasture and croplands unprotected from erosion and sedimentation. As runoff travels over or through the ground, other pollutants (e.g., pesticides, pathogens, nutrients) may be dislodged, attach to, and be transported by

erosion to receiving waters, during and after rain events. In some instances, landowners continue to mechanically clear riparian areas of vegetation in order to increase pasture and cropland acreage. Therefore, in order to effectively address the TMDL (organic enrichment/low dissolved oxygen), the management of erosion and sedimentation must be a primary focus of best management practice (BMP) implementation efforts.

Extent: Most drainage ways in the Yellow Bank Creek Watershed have been channelized. This has increased erosion, sedimentation, and flooding potential. Farm size averages about 150 acres; 31% cropland (1,925 acres), and 15% pastureland (931 acres). Conventional cropping systems are resulting in an average soil loss of 6-7 tons/acre/year - which exceeds the tolerance level "T" for all soil types in the watershed. Conservation plans will be prepared for 80% of the cropland in the watershed to reduce soil erosion to the tolerance level.

B. Nutrients: Organic enrichment is one of the most abundant and widespread NPS runoff problems in the watershed and often leads to low dissolved oxygen problems. Livestock, many with unrestricted access to streams throughout the watershed, deposit manure directly to the creek or streambed, and trample/destroy aquatic and riparian vegetation and habitat. Pastures are generally heavily grazed and in poor to fair condition. There are several heavy use feeding and loafing areas. In addition to nutrients, water quality may also be impaired by pathogens from manure runoff.

Extent: Livestock (Animal Unit (AU) concentrations) in the lower Flint River Watershed are 0.13 AU/acre (Cattle = 0.12 AU; Swine = 0.01 AU). There are two animal feeding operations (AFOs) in the watershed, but no CAFOs (confined animal feeding operations).

C. Other Nonpoint Causes and Sources: Stakeholders have identified additional problems that may be impairing water quality in the Yellow Bank Creek Watershed. The organic enrichment/dissolved oxygen TMDL does not directly address these problems. However, this watershed plan does seek to address additional problems above and beyond implementation of the TMDL. These "other" NPS problems are presented in Table 1.

Table 1:

Cause	Problem	BMPs or Estimated Pollutant Load Reductions
Erosion	To protect cropland and pasture land productivity; protect receiving waters from turbidity/sedimentation, to protect streambanks and riparian areas; reduce head cutting; reduce potential for flooding	Install riparian buffers on 80% of cropland (reduce sheet and rill erosion reduced by 50%; gully erosion by 100%) This is expected to save 6-7 tons/acre/year on 1,540 acres (1,780 tons/year total)
pH	Water quality should be protective of aquatic species survival and reproduction	Use plan recommended BMPs to maintain stream flows at 6.0-8.5 su.
Siltation	To protect aquatic species, habitats and reproduction	Use CRP to create approx. 100-A of new buffers (15-yr contract). Expand existing buffers to 300-ft wide. Establish new buffers a minimum of 35-ft.
Pathogens	Reduce animal and human heath risks associated with deposition and runoff of livestock manure	Reduce coliforms to <200 counts/100 mL for non-critical stream flow periods (Dec - April). Address using erosion/nutrient BMPs per conservation plans.

Pesticides	Reduce human heath risks; protect aquatic species, habitats and reproduction	Use NRCS Win-Pest program setbacks/buffers/pesticide recommendations and develop conservation plans on 1500-A cropland and 250-A pastureland

The selection and installation of BMPs identified by this plan to address TMDL sources and causes (organic enrichment/dissolved oxygen), will most likely, *concurrently* and *effectively,* address the NPS concerns in Table 1, above. Examples of these recommended BMPs include fencing off cattle from the streams, re-establishing riparian areas, developing cattle stream-crossings, and planting winter cover crops on barren or fallow land during non-grazing times.

TMDL Load Reductions Expected for the Management Measures to be Implemented

A. NPS TMDL Pollutant Load Reduction:

This watershed management plan is designed to implement the; "*Final TMDL Development for Yellow Bank Creek*, *AL/0603002-210_02: Low Dissolved Oxygen/Organic Loading*" [ADEM Water Quality Branch, Water Division (April 2003)]. Water quality data collected June - October 1997 has indicated that the Fish and Wildlife (F&W) minimum water quality standard for dissolved oxygen (5.0 mg/L) was not met 20% of the time from June 1997 - August 1999. Generally, low in-stream dissolved oxygen (DO) concentrations may be caused by several sources such as the decay of oxygen-demanding waste from point and nonpoint sources, algal respiration, sediment oxygen demand, or other sources. However, it is believed that the low DO observed in the Yellow Bank Creek watershed is not the result of algal dynamics. In fact, data indicates that DO impairments generally occur during the dry, summer months when stream flows are low and water temperatures are high. The lowest observed DO value occurred during an August 1997 sampling event when the measured level was 4.8-mg/L. In addition, data collected by TVA during 1994 and 1995 indicated that fish and macroinvertebrate communities were also impaired. These biological impairments are thought to be the result of siltation and organic enrichment/dissolved oxygen, but data from water column sampling is not available to ascertain this assumption.

The TMDL provides that the principal causes of low DO are $CBOD_u$ (ultimate carbonaceous biochemical oxygen demand) and NBOD (nitrogenous biochemical oxygen demand) pollutants. $CBOD_u$ is a measure of the total amount of oxygen (O_2) required todegrade the carbonaceous portion of the organic matter present in the water. NBOD is the amount O_2 utilized by bacteria as they convert ammonia to nitrate. Summer months (May - November) are generally the critical conditions for DO impairments. Reaction rates for $CBOD_u$ and NBOD (i.e., organic loading) are temperature and stream flow dependent. High summertime temperatures and periods of low precipitation increase organic residence time and decrease re-aeration rates. Therefore, oxygen (O_2) depletion is common in Yellow Bank Creek in the summertime. Water quality samples will be used to determine if targeted $CBOD_u$ and NBOD concentrations (Table 2), in concert with nitrification of ammonia, will not deplete the DO below the 5-mg/L Fish & Wildlife standards as a result of organic matter breakdown processes.

Table 2: Maximum Pollutant Loads by Source for the Critical Period: May – November

Pollutant	Allowable NPS Loading (lbs/day)
$CBOD_u$	1.7
NBOD	1.5
Total	3.2

Data derived from Draft TMDL. June 2002. p. 5.

According to the TMDL model, the existing NPS loading is 11.2 lbs/day (Table 3). The organic load reductions presented in Table 3 are required to bring Yellow Bank Creek into compliance with the state's Fish and Wildlife water quality standard of 5-mg/L. Since there are no point sources in the watershed, a 61.6% organic load reduction from nonpoint sources will be required to bring Yellow Bank Creek into compliance with the Fish and Wildlife dissolved oxygen water quality standard of 5-mg/L. It should be noted that water quality data on which the TMDL model was based was limited. However, it is expected that as new water quality/quantity data; pollutant load reduction data; or land use change information becomes available, the TMDL and applicable components of this management plan will be revisited in order to assure that load reductions are achieved.

Table 3: Required NPS Load Reductions for Yellow Bank Creek

Total Existing Organic Loading (lbs/day)	Reduced Loading Needed (lbs/day)	Total Organic Load Reduction Needed (%)
11.2	6.1	61.6

NPS Loading = CBODu + NBOD
Data derived from Draft TMDL. June 2002. p. 27.

Flexibility is built into the design of assessment and monitoring activities of this TMDL/watershed management plan. Pollutant load reduction targets and BMPs will be reviewed if in-situ monitoring or professional judgment indicates water quality standards are not being achieved. Citizen perception (e.g. targeting/site selection, parameters, etc.) will also be considered as a feedback loop by water quality monitoring/collection entities. Additional monitoring efforts are presented in this document under, "*Criteria to Determine if NPS Pollutant Loading Reductions are Being Achieved*."

B. SWAT Modeled NPS Pollutant Load Reduction:

In March 2005, the Soil and Water Assessment Tool 2000 (SWAT2000) was used[(1)] to simulate and predict storm water runoff, soil erosion, nutrient transport, nitrogen leaching, and other aspects of agricultural/urban NPS pollution in the Yellow Bank Creek Watershed. The SWAT model has been widely applied and validated throughout the United States. It is approved by EPA as a tool for development of TMDLs. It has also been integrated into EPA's publicly available "BASINS 3" environmental analysis system software package.

With recent advancements in technology, many watershed pollutant-loading assessments are being conducted by combining geographic information systems (GIS) and computer simulation models to predict NPS loadings. This ability helps stakeholders to accurately predict the causes and sources of potential problems, and provides good estimates of nutrient/sediment loadings throughout the watershed. The SWAT model was used in the Yellow Bank Creek Watershed to, a) identify and rank critical NPS impaired areas, b) predict nutrient (N and P) loadings from stream segments, and c) predict and evaluate the overall reduction efforts that on-the-ground best management practices (BMPs) may have on the watershed.

The SWAT watershed simulation reported values that represent the total amount or the weighted average of all hydrologic response units within the watershed. Two distinct time periods and two distinct land use management treatments (pre- and post-BMP placement and implementation) were used to evaluate the effectiveness of the proposed BMPs. Estimates of sediment, nitrogen, and phosphorus loadings were based on soil types, slopes, current land uses, land management practices, and weather.

The SWAT model was useful in predicting potential critical areas of NPS pollution. Results are presented below:

Pollutant	Unit	Jan 1, 1999 - Dec. 31, 2004		Jan 1, 2005 - Dec. 31, 2010	
		Pre-BMP	Post-BMP	Pre-BMP	Post-BMP
Sediment	tons/acre	12.69	6.8	12.3	6.8
Organic N	pounds/acre	14.8	11.46	14.79	1.4
Nitrate (NO3)	pounds/acre	2.22	1.75	2.15	1.60
Organic P	pounds/acre	2.44	1.30	2.30	1.31
Soluble P	pounds/acre	0.19	0.08	0.10	0.08

Note: All values are averages of six-year simulations

SWAT simulation results also indicated that most of the NPS pollution is attributed to row crops (corn, soybeans, and a small amount of cotton). The simple incorporation of adding a winter cover crop to row cropped lands can reduce sediment loadings by 47%. In addition, improper management of animal waste from intensive livestock also contributes a significant NPS pollution load into Yellow Bank Creek. Fencing off the cattle from the creek can reduce organic nitrogen enrichment by 23%, and reduce organic phosphorus by 11%.

Before BMP Implementation Simulation Results

Pollutant	Loading	Unit
Sediment	12.7	tons/acre/yr
Organic nitrogen	14.7	pounds/acre/year
Organic phosphorus	2.22	pounds/acre/year

(Averaged from two separate 4-year time periods)

After BMP Implementation Simulation Results*

Pollutant	Load Reduction	Percent Reduction	Unit
Sediment	6.80	47	tons/acre/yr
Organic Nitrogen	11.5	23	pounds/acre/year
Nitrate N	-	47	-
Organic Phosphorus	1.75	11	pounds/acre/year
Soluble P	-	57	-

*In order to simulate placement of BMPs, a 30-meter stream buffer zone and a cover crop was incorporated into the land use data layer to reduce erosion over the same (before) 4-year time period.

[(1)]Yellow Bank Watershed Assessment Using GIS / Modeling Simulation Tools: Sediment, Nitrogen and Phosphorus Loadings in the Yellow Bank Watershed. J.M. Beck, Ph.D. Tennessee Valley Regional Research and Extension Center, Agronomy and Soils Department, Auburn University, AL. March 2005.

Best Management Practices to Achieve TMDL/Watershed Plan NPS Pollutant Load Reductions

This TMDL/watershed management plan seeks to implement environmentally protective and economically realistic BMPs, where practicable and technologically feasible, in order to meet or exceed TMDL pollutant load reductions. BMP types and numbers in this plan are recommendations - but are based on current landuse practices, land cover, and watershed activities. Voluntary, incentive based approaches will be used

to implement BMPs throughout the watershed. Providing opportunities for local stakeholder input and participation will continue to be a critical BMP implementation component of this watershed plan.

The Madison County SWCD has proposed to implement a three-year duration Section 319 project in the Yellow Bank Creek Watershed (FY03 incremental funds). The District will target areas where NPS stressors are causing the greatest impairments, and implementation of BMPs will yield the greatest benefits for the grant dollars to be expended (Table 4). The Madison County Watershed Advisory Committee, FRCA, TVA, and others will provide technical assistance and volunteers for BMP implementation. These and other project cooperators are expected to provide education and outreach; and secure commitments from landowners who are willing to voluntarily install BMPs. Following the development of the "final" Yellow Bank Creek Watershed Management Plan, Section 319-funded BMP sign-up may begin in 2005. The BMPs presented below are expected to address the organic enrichment/low dissolved oxygen TMDL, and reduce other problems associated with NPS runoff in the Yellow Bank Creek Watershed. The BMPs below will be implemented within a 3-year timeframe.

Table 4

Item Description	Number	Average Cost	Budget		
			Federal	Nonfed	Total
Channel bank vegetation	20 acres (seed, sod, tree planting; lime, fertilizer; land preparation)	800/ac	10,667	5,333	16,000
Critical area planting (seed, lime, fertilizer; grading and shaping)	20 acres (seed, lime, fertilizer; grading and shaping)	164/acre	2,187	1,093	3,280
Fencing	6,567 ft (4 strand barb; steel post)	0.77/ft	3,371	1,686	5,057
Fence gate assembly	15 (14-ft each)	190 each	1,900	950	2,850
Livestock exclusion	13,133 ft (4 strand barb; steel post)	0.77/ft	6,741	3,371	10,112
Pasture hayland planting	100 acres (seed, lime, fertilizer)	164/acre	10,933	5,467	16,400
Well drilling and casing	3 each (300 ft depth)	21/ft	12,600	6,300	18,900
Piping	6,800 ft (1" PVC to water troughs)	0.85/ft	3,853	1,927	5,780
Pumps	3 each (livestock alternative water)	1,110 each	2,227	1,113	3,340
Heavy use area protection	10 each	1,000 each	6,667	3,333	10,000
Watering facilities and pads	10 (2-hole ball trough)	900 each	6,000	3,000	9,000
Livestock Shade Structure	5 each (20'x40')	1.85/sq ft	4,933	2,467	7,400
Livestock stream crossing	4 each (geocell, gravel crusher run, grading and shaping)	2,500 each	6,667	3,333	10,000
Power pole and meter	8 each (wiring to well pumps)	1,500 each	8,000	4,000	12,000
			$86,746	**$43,373**	**$130,119**

The federal costs for BMPs presented in Table 4 are expected to be funded using EPA/ADEM approved FY03 Section 319 grant incremental watershed project funding. Nonfederal real or in-kind costs and services will be provided by the Alabama Soil and Water Conservation District (SWCD), Alabama Cooperative Extension System (ACES), Alabama Department of Agriculture and Industries (ADAI), and/or private landowners and project volunteers. The USDA-Natural Resources Conservation Service (NRCS) will provide technical assistance.

Installing proven and effective BMPs can dramatically reduce siltation/sedimentation. Erosion and nutrient control BMPs will eventually improve water quality, protect the ecological health of the watershed, and reduce the potential for flooding. Reductions in nutrient (and pathogen) pollutant loading will require a primary focus on animal husbandry. The BMPs presented in Table 4 represent a best guess estimate of some known watershed needs. Actual numbers, types, and BMP costs may change as the Yellow Bank Creek Watershed Plan is implemented. In addition, stakeholder feedback may necessitate that this Management Plan be revised at some point in the future. Future management plan revision(s) may impact:

- Selection, targeting, or funding of "future" BMPs (also see Table 5)
- New or additional BMPs needed to address TMDL sources and causes or other watershed plan concerns
- Additional watershed/water quality monitoring and assessment data
- Human health and threatened and endangered (T&E) species protection needs and priorities
- Project and resource agency staff, technical assistance, technology transfer
- Long-term local citizen interest, project sustainability (institutionalization)
- Other grant or watershed project plan goals or objectives

Additional pollution prevention BMPs will be needed to effectively address threats to the watershed. These issues are presented in Table 5 below. However, at this time, funding for implementation has not been attained. However, it is expected that future Farm Bill [e.g., USDA's Environmental Quality Incentives Program (EQIP) and Conservation Reserve Program (CSP)] and additional Section 319 grant funding will be used to implement these needed measures. The Watershed Coordinator will seek in-kind and real funding to implement these practices as expeditiously as possible - hopefully within a 5-year timeframe. The current shortfall between needs and available resources are identified below.

Table 5

BMP	Number, size, area, etc.	Estimated Costs
Grazing land Vegetation Improvements	250-A	25,500
Fencing for Rotational Grazing	30,000-ft on 150-A	15,000
Fencing for Livestock Exclusion	20,000-ft on 100-A	16,000
Livestock Stream Crossings Installed	25	60,000
Conservation Tillage	1,540-A	185,000 (over 3 years)
Livestock Water Supply	10	10,000
Riparian Buffers Expanded/Installed	Expand Existing to 300-ft Establish new (min. 35-ft)	40,000
Conservation Plans for Pesticide Management	1500-A cropland 250-A pastureland	Incorporated in Technical Assistance /Coordinator
Conservation Plans for Soil Erosion	80% of cropland	Incorporated in Technical Assistance /Coordinator
Technical Assistance / Coordinator	3 years	100,000

This management plan encourages an adaptive BMP implementation approach. Funding and other resources are obviously not available as the present time to expeditiously implement all component of this plan. Water quality data information, stakeholder priorities, staff and expertise, landowner participation, and other factors will guide BMP targeting with current resources available (most bang for the buck). Water quality or modeled data will also be used to determine whether NPS loading reductions are being achieved over time and substantial progress is being made towards attaining, or assuring continued attainment of, water quality standards. If water quality analyses or modeled load reduction data and information indicate the water quality standards are not being met, then the Project Coordinator will facilitate watershed plan revisions and/or the ADEM will re-visit the NPS TMDL.

Agricultural BMPs presented in "Protecting Water Quality on Alabama's Farms" (Alabama Soil and Water Conservation Committee, NRCS, ACES, and ADEM Section 319. Oct 1995), should be promoted through the watershed. All agricultural BMPs will be identified as applicable and necessary in a conservation plan or waste management plan and, if applicable, comply with ADEM's AFO/CAFO "*Registration by Rule*" permit requirements and program initiatives. All agricultural BMPs will also meet minimum technical requirements addressed in the NRCS Field Operational Technical Guide (FOTG), including, a) Practices, Standards, and Specifications, b) Agricultural Waste Management Field Handbook, c) Conservation Technical Notes, and d) Guide Sheets. Section 319(h) funds will not be used to redress a water quality standard violation enforcement action.

Streamside management and riparian area BMPs will be based upon NRCS FOTG practice standards, specifications, notes, or guide sheets. Any Section 319 grant funds to be utilized for engineered riparian or watershed restoration/enhancements will consider fundamental principals of fluvial geomorphology as presented in Applied River Morphology (Dave Rosgen, Wildland Hydrology, Pagosa Springs, Colorado, printed by Media Companies, Minneapolis, MN, 1996). Alternately, the, Stream Corridor Restoration - Principles, Processes, and Practices manual (The Federal Interagency Stream Restoration Working Group, October 1998) should be consulted.

Silvicultural BMPs must be consistent with Alabama's Best Management Practices for Forestry (Alabama Forestry Commission, in cooperation with ADEM. 1993).

Implementation of urban/construction, resource extraction, hydrologic/habitat modification, land disposal, and other BMP activities identified in this Management Plan (or other funding/project workplans) must abide by applicable federal and state permits, certification programs, rules, regulations, and guidelines. The Watershed Project Coordinator will assure that necessary approvals are in-place before land disturbance or BMP implementation activities begin.

The federal costs of agricultural BMPs will be determined using the cost-averaging method per Title 120 of the USDA-NRCS General Manual. Non-federal cost-share and grant match will be real or in-kind and derived from landowners/landusers, state agencies, and citizen volunteers - particularly, watershed committee advisory members and the Alabama Clean Water Partnership.

Continuing to promote the Homebuilders Association of Alabama's Stormwater Certification Programs, as well as continuing to offer septage treatment training and workshops, will likely be used to address the TMDL urban runoff/storm sewers "cause." It is expected that workshop registration fees will be used to fund these activities. Microbial source tracking methodologies should be researched to assess its appropriateness in ascertaining real or perceived human vs. animal pathogen contributions in the watershed.

Alternately, citizen volunteer monitors certified in Alabama Water Watch bacteriological protocols will be used to assess real or potential pathogen problems. It is believed that implementation of the identified BMPs discussed within this watershed management plan will effectively and concurrently address any pathogen problems throughout the watershed.

Pollution prevention (reduce, reuse, recycle) will be promoted by the Project Coordinator. In addition, best management practices will be planned and installed with a focus on continued and long-term maintenance.

Technical and Financial Assistance

The Madison County Soil and Water Conservation District (SWCD), USDA-Natural Resources Conservation Service (NRCS), and Alabama Department of Environmental Management (ADEM) will provide technical information and assistance. The NRCS will provide BMP plan and technical assistance, and develop conservation and animal waste management plans. The SWCD will facilitate "on-the-ground" implementation of BMPs and provide oversight of day-to-day project activities. Responsibility for ensuring water quality protection abides with ADEM under Admin Code R. 335-6-10-.09(5) (a)(b) (c) (d) and (e)7. The Alabama Forestry Commission will provide streambank protection silviculture expertise.

A Watershed Project Coordinator will continue to provide oversight for assuring approved conservation plans are "in-place" for all landowners receiving watershed management program state or federal cost-share or Section 319 grant funding in the Yellow Bank Creek Watershed. The Watershed Project Coordinator will also assure that necessary permits, certifications, and approvals are in-place. The Coordinator position has real and in-kind funding commitments from TVA, SWCD, ADEM/Section 319, City of Huntsville, Flint River Conservation Association.

Yellow Bank Creek Watershed stakeholders may directly or indirectly benefit from concurrent and larger scope and scale Flint River Watershed Management Plan activities as that plan continues to be implemented. Assistance may include all, or components of, the following:

a) The Solid Waste Disposal Authority of the City of Huntsville implements the "Handle With Care" program, where Madison County residents are provided means to safely dispose of hazardous household chemicals and products in an environmentally protective manner.
b) To identify and protect groundwater (including aquifers of the Yellow Bank Watershed), the City of Huntsville has identified major groundwater withdrawal zones.
c) The Tennessee Valley Authority (TVA) has conducted clean boating activities on Wheeler Reservoir/Flint River since 1999. The Clean Marina Initiative was introduced in 2001 to reduce recreational NPS pollution and addresses boat septage pump-outs, and petroleum products and litter disposal BMPs. The ADEM and the Alabama Mountains, Rivers, and Valleys Resources Conservation and Development Council (RC&D) coordinated distribution of locator maps of pump-out stations.
d) The FRCA has sponsored Alabama Water Watch (AWW) training workshops to certify volunteer monitors and to expand the number of sampling sites. Volunteer monitors are recertified annually by an AWW Quality Assurance Officer in order to ensure data quality (quality assurance officers and trainers are required to attend refresher courses every two years). The AWW published (Fall 2003) and continues to distribute the *Citizen Guide to Alabama Rivers - Tennessee*.
e) The FRCA provided a Nonpoint Education for Municipal Officials (NEMO) presentation to the Madison County Commission in the Fall of 2002. The meeting set the stage for continued discussions regarding urban sprawl, low impact development, and impervious ground cover.

f) The FRCA, NRCS, Madison County SWCD, and others sponsored erosion and sediment control workshops in January 2003 and 2004, and are expected to continue on an annual basis.
g) The FRCA has sponsored storm drain stenciling in the Flint River Watershed's urban areas.
h) The SWCD completed a 3-year Section 319 project that resulted in several BMPs being implemented throughout the Flint River Watershed.
i) The RC&D provides septic system maintenance brochures to county Health Departments for distribution. A workshop was held in the Fall of 2002 targeting professional installers who needed continuing education credits for onsite wastewater system installer's license.

In addition to providing Yellow Bank Creek Management Plan development assistance; BMP implementation and technical resource documents, tools, and models; and conservation and animal waste management plans, the NRCS provides assistance through a number of federal cost-share programs. The Natural Resource Inventory, public service announcements, technical documents, is also available on the NRCS website at http://www.al.nrcs.usda.gov. Local stakeholders may also obtain information from the Madison County USDA Service Center (819 Cook Avenue, Huntsville, Alabama - 35801; Telephone 256-532-1692). NRCS programs provide technical and/or financial assistance to landowners for conservation of particular land uses and restoration of natural habitats. On-the-ground BMP sign-ups for Section 319 grant funding will be advertised in accordance with established USDA program cost-share methodologies. The Yellow Bank Creek Watershed programs presented below are also discussed in the larger scope and scale Flint River Watershed Management Plan. Cost-share may be made available through the:

Conservation Reserve Program (CRP): This program was established as a conservation provision of the Farm Bill to encourage and assist producers who are willing to set aside highly erodable, riparian, and other environmentally sensitive lands from crop production for a 10 or 15-year period. Producers enroll in the program according to USDA program rules. If a landowner's CRP bid is accepted, a Conservation Plan of Operation is developed. In addition to an annual CRP payment, USDA will provide a 50% cost-share to establish the selected conservation practice. Landowners may receive a maximum of $50,000 annually in CRP payments.

Wetlands Reserve Program (WRP): This voluntary program for restoring wetlands is administered by NRCS with technical assistance from the Fish and Wildlife Service (FWS). Participating landowners can establish conservation easements of either permanent or 30-year duration or can enter into restoration cost-share agreements where no easement is involved. The NRCS and FWS assist private landowners with site selection and development of restoration plans. Up to 100% of the cost of restoring the wetland is provided by USDA.

Environmental Quality Incentives Program (EQIP): This USDA program works primarily in conservation priority areas where there are significant natural resource problems. High priority is given to areas where state or local governments offer financial, technical, or educational assistance and to areas where agricultural improvements will help meet water quality objectives. Landowners can apply for assistance in addressing animal waste management, erosion, and other problems. EQIP will provide up to 60% cost-share for restoration. A landowner may receive up to $50,000 annually in EQIP payments.

Wildlife Habitat Incentives Program (WHIP): This is a voluntary program for landowners who want to develop and improve wildlife habitat on private lands. Participants work with NRCS to prepare a wildlife habitat development plan. USDA provides technical assistance, and cost-share up to 75% of the cost of installing the wildlife habitat practices. USDA and the participant enter into a cost-share agreement that usually lasts a minimum of 10 years.

Grassland Reserve Program (GRP): This is a voluntary program that helps landowners and operators restore and protect grassland, pastureland, and certain other lands while using the areas for grazing. The program supports plant and animal biodiversity, and grasslands and lands containing shrubs and forbs under the greatest threat of conversion.

Education and Outreach

A substantial component of the Yellow Bank Creek Watershed Plan is directed to stakeholder education and outreach. A substantial amount of education and outreach will be targeted to the New Hope community and school system (the population center of the Yellow Bank Creek Watershed). Community meetings, led by the Project Coordinator and the Madison County SWCD, will be held to inform watershed citizens about funding and other opportunities to implement this management plan.

The initiatives discussed herein will play an important role in energizing and organizing citizen input and participation in watershed management. The concept of "think globally - act locally" will be stressed. In addition, stakeholders will be advised that many "local" nonpoint source problems will require "local" solutions. Depending on the need, efforts will target many and varied audiences since stakeholders require a differing education need, approach, or delivery mechanism. Audiences may include land owners, land users, agricultural producers, builders and contractors, teachers, students, homeowners, business and community leaders, elected officials, etc.

1. *Strategy*: The Yellow Bank Creek Watershed Plan seeks to improve and protect water quality in the watershed in order to meet or exceed Alabama's water quality standards for its Fish and Wildlife use classification. Education and outreach will be designed to:

a) Increase public awareness about the value and long-term environmental and economic advantages for protecting and improving water quality in the Yellow Bank Creek Watershed
b) Increase public awareness of the ecological significance of the Yellow Bank Creek Watershed
c) Increase public awareness of how BMPs improve and protect water quality
d) Increase public awareness of how landuse and corporate/individual activities affect water quality
e) Increase public awareness about threatened and endangered species, riparian area protection, and aquatic habitats

2: *Implementation*: The following tasks provide adequate opportunities for stakeholder learning and encourage positive changes in stakeholder habits and attitudes about the watershed. In order to prevent conficts or duplication of efforts, the larger scope and scale Flint River Management Plan and this smaller scope and scale subwatershed plan (Yellow Bank Creek) will combine some education and outreach activities in order to more effectvely and expediously:

a) Educate citizens about water quality protection and enforcement rules and regulations
b) Promote implementation of BMPs type, cost, and effectiveness
c) Educate recreational boaters about marine pump-out facilities and problems caused by irresponsible recreational activities and littering of waterways
d) Provide education that targets different audiences
e) Educate installers, homeowners, and businesses about proper septic tank placement, installation, operation, and maintenance; or alternative on-site sewage treatment technologies

f) Educate stakeholders about the importance of limiting the amount of impervious surfaces less than 10% of the total land area in the watershed by using better site design and growth management planning
g) Educate residents about protecting and retaining natural areas
h) Implement planning tools to manage growth and land use changes in the watershed
i) Provide education and training opportunities for erosion control and sedimentation for public works employees, and others involved in private road building and land disturbance activities
j) Promote the use of watershed signage to identify watershed boundaries and watershed protection awareness

The Watershed Project Coordinator will facilitate education and outreach opportunities in order to increase public awareness of the significance, need, and value of the watershed. The NRCS, Flint River Conservation Association, TVA, and Earth Team Volunteers are ready to assist the Watershed Project Coordinator with all education and outreach activities. Activities will involve community outreach meetings, surveys, field days and tours, and delivery of published and electronic media presentations and materials.

Public education and outreach also provide opportunities for public comments and management plan input. To support these "feed back" activities, the Watershed Project Coordinator may:

a) Present 2 community meetings annually to provide an opportunity for stakeholders to attend at least one. The objective of the meetings will be to: 1) inform the public about the status of the management plan and update about on-going watershed management efforts; 2) emphasize community-based environmental protection, 3) provide an opportunity for citizens to express concerns and ideas.
b) Conduct surveys of meeting attendees at community meeting (above) in order to assess "before and after" environmental, social, economic, public health, or other BMP implementation and maintenance issues
c) Conduct 2 community-based field trips/tours over a 3-year period to view and discuss water quality and ecological issue and values, BMPs for impaired sites, and other management plan strategies.
d) Prepare semi-annual press releases for area media that serves the Yellow Bank Creek Watershed
e) Conduct 4 presentations to civic or professional groups and teachers/schools, that focuses on water quality protection and conservation activities in the watershed.

The Alabama Cooperative Extension System (ACES) promotes environmental stewardship through promotion of effective and economically achievable best management practices. Conferences, workshops, seminars, environmental quality programs, and fish and wildlife programs are offered by Extension agents Assistance activities also include newsletters, bulletins, information sheets, and research reports on the website http://www.aces.edu/Madison/

The Madison County Soil and Water Conservation District hosts an annual Teacher's Workshop each summer. The 40-hour, weeklong workshop with intensive hands-on training is open to all Madison County teachers. Several partners provide real and in-kind financial assistance. For nearly 8 years, the City of Huntsville, COVANTA, BFI, Cotton Incorporated, JR Enterprises, Sunshine Supply, Domino's Pizza, Coca-Cola, Kiwanis of Huntsville West, FRCA, Publix Foods, Frito-Lay, Wise Alloys, COSTCO, Montesano, Huntsville Utilities, Farmer's Federation, Discovering Alabama, Chapman Builders Club, and the Alabama Geological Survey have contributed an estimated $10,000 in cash and supplies to support Madison County Soil and Water Consecration District Education and Outreach Programs. The Yellow Bank Creek Watershed in Madison County benefits from these and other countywide conservation and natural resource awareness activities.

Urban runoff/storm sewer impairments may be addressed by continuing to promote the Homebuilders Association of Alabama's Stormwater Certification Programs, as well as continuing to offer septage treatment training and workshops for the construction industry. It is expected that workshop registration fees will fund these activities.

Pollution prevention ("Watershed in a Box") will continue to be addressed at the annual Drinking Water Festival (held each May). This program involves all county 4th graders and delivers stormwater programs to 5th and 9th graders in the 28 schools in Madison County. In addition, drinking water quality protection tips and facts, delivered annually to Madison County Water Department customers (about 65,000 people) since 2003, are used as a citizen education mechanism. Madison County also sponsors booths, demonstrations, and presentations at local schools, fairs, and festivals; and this will continue.

There are a number of voluntary education and outreach programs that may greatly impact this watershed. Citizens can take active roles in: Adopt-A-Watershed, NRCS - Earth Team, Alabama Water Watch, Nonpoint Education for Municipal Officials (NEMO), Alabama Clean Water Partnership, Tennessee Valley Clean Water Partnership, Madison County Watershed Advisory Committee, and the Flint River Conservation Association.

This management plan is designed so that long-term improvements in water quality may be realized using a cooperative long-term, partnership approach. Some efforts may be difficult to quantitatively measure or document. Therefore, any definitive watershed benefits expected are speculative at this time. However, water quality will be improved as: 1) stakeholder awareness is increased, 2) stakeholders are provided opportunities to participate in decision-making processes, 3) this TMDL/watershed-based plan is implemented, and as, 4) water quality monitoring and assessment information is acquired and analyzed.

Schedule for Nonpoint Source Pollution Management Measure Implementation

This project will address stakeholder awareness - particularly the role agencies, landowners/users, businesses, community/civic/watershed groups, and private citizens can and must play in watershed protection. It will assist stakeholders in assuming local ownership for local watershed problems. It presents reasonable and cost-effective management options that can be locally implemented and maintained. However, it is recognized that even after reasonable steps have been taken - it may require a number of years to achieve the management plan goal or for water quality improvements to be realized.

This management plan supports watershed-partnering efforts. It seeks to enhance watershed protection by fostering stakeholder input into watershed decision-making processes. It seeks to identify NPS problems and to work cooperatively with stakeholders to resolve them. This plan is a critical component of federal, state, and local watershed protection efforts. It addresses effective and efficient mechanisms to obtain the greatest watershed benefits from limited funding. The schedule for implementation in Table 6 below is combined with a description of interim, measurable milestones. However, it is acknowledged that some activities and practices may change or be revised as the plan is implemented, as new or additional data and information is obtained, or funding becomes available.

Table 6: Description of Interim, Measurable Milestones

Activities and Practices	Timeline	Responsible Entities
Activity: Complete the TMDL/watershed-based	June 2004	Madison

management plan for the Yellow Bank Creek Watershed Interim Measures: • Advertise meetings for stakeholder input • Conduct stakeholder meetings • Revise plan if water quality/other data indicates goal is not being achieved • Update the plan based on stakeholder input before, during, and after implementation	Continuous	County Watershed Advisory Committee NRCS; SWCD; Watershed Coordinator
Activity: Hire a Watershed Project Coordinator Interim Measures: • Develop roles, responsibilities and work schedule • Advertise for the position	October 2004	SWCD/NRCS/ TVA/FRCA/ City of Huntsville
Activity: Execute an interagency Cooperative Agreement for the Yellow Bank Creek Watershed Project Interim Measure: • Continue to build and maintain agency and local citizen interest and partnering	Within 3 months of Section 319 EPA/ADEM workplan approval	ADEM/SWCD SWCD
Activity: Implement the TMDL/Watershed Plan Interim Measures: • Identify sites, types, and number of BMPs to be installed based on available funding • Coordinate implementation of BMPs with appropriate partners' capabilities and expertise • Implement appropriate BMPs to address TMDL sources and causes; and N, P, and sediment reductions • Adapt implementation of BMPs identified in this plan based on new/better information or new funding	Begin within 1 month of the Cooperative Agreement signing date. Continue until management plan goal is achieved	SWCD; NRCS; Watershed Coordinator
Activity: Provide education and outreach to landowners and landusers. Interim Measures: • Coordinate partnership opportunities/resources • Produce/deliver appropriate materials to target specific audiences • Measure/survey audiences' response	Begin within 1 month of cooperative agreement and continue indefinitely	SWCD; Watershed Coordinator
Activity: Conduct water quality monitoring and assessments of the watershed (pre- and post-BMP implementation). Distribute results to public. Interim Measures: • Develop a monitoring plan in accordance with ADEM's Quality Assurance Management Program Plan (QAMP)	Continue until management plan goal is achieved	ADEM; Alabama Water Watch

• Compile and report analyses results in user-friendly electronic and hard-copy formats		
Activity: Report NPS pollutant load reduction information at least semiannually to EPA/ADEM. Provide implementation and reports to stakeholders as requested. Interim Measures: • Use models, field measurements, or water quality monitoring data and information to assess pre/post implementation success/failure • Report estimates of TMDL and N, P, and Sediment pollutant load reductions	Begin within 6 months of Section 319 BMP implementation. Continue for the duration of the project	SWCD; Watershed Coordinator
Activity: Submit Section 319 semiannual, annual, project closeout and other reports and information as requested Interim Measures: • Semiannual reports submitted to ADEM annually by March 15 and September 15 • Final Section 319 closeout report submitted to ADEM within 30 days of cooperative agreement end date.	Begin 6 months of coop. agreement begin date. Continue until the management plan goal is achieved.	SWCD; Watershed Coordinator

Watershed project status reporting will be entered into the EPA grant tracking system (GRTS). Additional reporting will be available to the public in the Alabama NPS Newsletter, Section 319 annual reports, or posted on the Soil and Water Conservation Committee website. Project overviews and progress reports will be presented at statewide, river basin, county, and local meetings and conferences. Newsletters and brochures, visits to schools and civic/service groups, and personal contacts will be used to convey the NPS TMDL/watershed plan message. It is expected that local news media will also widely broadcast project coverage

Criteria to Determine if NPS Pollutant Loading Reductions are Being Achieved

Monitoring Overview: Water quality monitoring will be conducted by ADEM. The monitoring process and funding is tentative at this time, however, a short-term monitoring plan is expected to be developed for the duration (3 years) of the Section 319 project. Long-term project success will be determined using intensive monitoring that follows ADEM's 5-year rotational river basin assessment approach. Monitoring will be coordinated with and reported to watershed stakeholders in Section 319 reports, at watershed meetings, the ADEM website, and ADEM basin assessment publications. The Watershed Project Coordinator and the Alabama Clean Water Partnership will also distribute water quality data and information. Data will also be entered into STORET and other databases. Monitoring sites will include historical ADEM watershed scale monitoring stations and targeted BMP implementation sites. A scientifically based and statistically valid probabilistic water quality approach may also be used.

Environmental indicators to measure BMP implementation success (or failure) will be developed in collaboration with watershed stakeholders and partners. Project deliverables and outcomes will be based on the evaluation of water quality data and stakeholder perception and input. BMP locations will be tracked using GIS. Post-BMP installation monitoring is expected to effectively determine pollutant load reductions

achieved by the installation of the BMPs. Physical, chemical, and biological (fish and macroinvertebrates) sampling, field measurements, and habitat assessments are expected to be conducted annually and will effectively assess the index of biotic integrity and measure TMDL pollutant "cause" targeting success. The Alabama Clean Water Partnership will be a primary water quality and project-reporting vehicle.

Water quality monitoring, using standard chemical, physical, and biological water quality parameters, may be used to assess pre- and post-BMP effectiveness and TMDL pollutant load reductions. Monitoring will particularly target nitrogen (N), phosphorus (P) and sediment reductions in support of Section 319 grant guideline and Grant Reporting and Tracking System (GRTS) needs. In addition, N, P, and sediment pollutant loading may be estimated using desktop models such as STEPL, SWAT, or other models. All ADEM water quality samples will be collected and processed according to the EPA-approved QAC Plan. A watershed-specific monitoring plan will be developed to address pre/post BMP implementation and will be revised, as necessary, as the project continues to evolve. Citizen volunteers of Alabama Water Watch, using protocols based on the state/national/international accepted and EPA-approved QAC Monitoring Plans, will also conduct water quality monitoring.

Evaluation and Assessment of Progress: Agencies responsible for implementing watershed activities will track BMP implementation and provide semiannual or annual reports to the Madison County Watershed Advisory Committee or Watershed Project Coordinator. Annual management plan implementation success evaluations will be based on:

1) Achievements of milestones
2) Achieving state water quality standards
3) Achieving the OE/DO TMDL (determined by $CBOD_u$ and NBOD)
4) Achieving Fish and Wildlife water quality use classification

Management Plan Update/Revision and Public Feedback

If the above evaluation criteria are not being *incrementally-achieved* in a timely manner, or for the resources available/expended, an interagency/citizen review of the plan will be conducted. Any watershed stakeholder may request the SWCD or the Watershed Project Coordinator for a timely review of the management plan. Investigations of BMP effectiveness may also be facilitated by the Soil and Water Conservation District. The District will receive public comments and recommendations and be responsible for updating/revising the management plan as needed. The NPS TMDL may also be reviewed by ADEM and revised/public noticed if water quality data indicates continuing water quality problems.

The District may revise the watershed management plan after public comments and requests are received and reconciled. If watershed plan evaluation criteria are being met (e.g. Evaluation and Assessment of Progress, above), the watershed plan will not be revised. If evaluation criteria are not being achieved, the implementation approach will be revised. If a different watershed issue(s) is identified during plan implementation, this management plan will be updated to address that concern. If changes are to be made, this watershed plan will be revised within three months of issue discovery. Stakeholders will be advised of management plan revisions at meetings, on stakeholder/agency websites, and using other media.

Yellow Bank Creek TMDL/watershed management plan assessment and monitoring will also be designed to be flexible so that load reduction targets and BMPs can be easily revised if in-situ monitoring or professional judgment indicates water quality standards are not being achieved. Citizen perception (e.g.

targeting/site selection, parameters, etc.) will also be considered as a feedback loop by water quality monitoring/collection entities.