Spring Creek Watershed Management Plan

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Spring Creek Watershed Management Plan

1.0 Introduction:

Spring Creek and its tributaries make up the Spring Creek Watershed (Figure 1-1), which lies within the Flint River Basin and ends its flow into Lake Seminole (USGS hydrologic cataloging unit GA-03130010). The watershed is located in the Dougherty Plain ecoregion and covers parts of six counties in southwest Georgia. These counties are Clay, Calhoun, Decatur, Early, Miller and Seminole (See Figure 1-2 for County Percentage of Watershed). The Claiborne Aquifer gives birth to Spring Creek in Clay County with most of the watershed being located within the Floridian Aquifer. The watershed covers an area of 491,729.25 acres and has a drainage area of 768.3 square miles. The main stem length of the watershed is 82 miles with an additional 472 miles of tributaries for a total length of 554 miles. Spring Creek and its tributaries have a designated use as fishing. The watershed has the highest species density of amphibians and reptiles on the continent north of Mexico (Georgia Rivers Network) and is home to two federally protected mussel species, the Shiny-Rayed Pocket Book and the Oval Pigtoe (See Table 1-1 for Protected Species).

A wide variety of soils are present within the Spring Creek Watershed ranging from poorly drained to well-drained. Three of the most common soils are the Tifton-Norfolk-Grady Association, the Wagam-Troup Association and the Orangeburg-Red Bay-Norfolk Association (See section 1.2 and Table 1-2 for soil types and descriptions located within the watershed.) A large portion of the land is used for agriculture purposes with an estimated 40% of the watershed being irrigated. The USGS National Land Cover Database Land cover indicates that the watershed is almost half in agriculture (45.3%); forested land (35.9%); pasture (5.8%); urban/transportation (5.6%); clearcut/ sparse vegetation (4.7%); open water (2.2%) and other (0.5%). See Figure 1-3 for the land use chart. The major crops in the watershed include peanuts, cotton and corn. Figures 1-4, 1-5 and 1-6 show production information for these three crops.

The majority of the Spring Creek Watershed is fully supporting its designated use. However, 55 miles of mainstream and tributary streams are classified under EPA's 303d list as not supporting or partially supporting. These 55 miles of the watershed are listed as not supporting or partially supporting due to fecal coliform, dissolved oxygen and sediment. The main sources of these three conditions are livestock waste, low flow and increased summer temperatures and row crop field erosion.

The Spring Creek Watershed Partnership is a group of individuals and agencies that are interested in restoring Spring Creek and its tributaries in order to remove them from the 303d list. Partners include private landowners and concerned citizens in the Spring Creek Watershed, Calhoun County, Clay County, Decatur County, Early County, Miller County, Seminole County, Golden Triangle RC&D, Flint River Soil and Water Conservation District, U.S. Fish and Wildlife Service, Natural Resource Conservation Service, Georgia Soil and Water Conservation Commission, The Georgia Conservancy, Georgia Department of Natural Resources, The Nature Conservancy, and Joseph W. Jones Ecological Research Center at Ichauway. The goal of the partnership is to implement a successful watershed plan through management and education as outlined in this watershed management plan. The plan was written according to EPA Section 319 guidelines for watershed plan development and addresses each of the nine required components.

Figure 1-1 Spring Creek Watershed

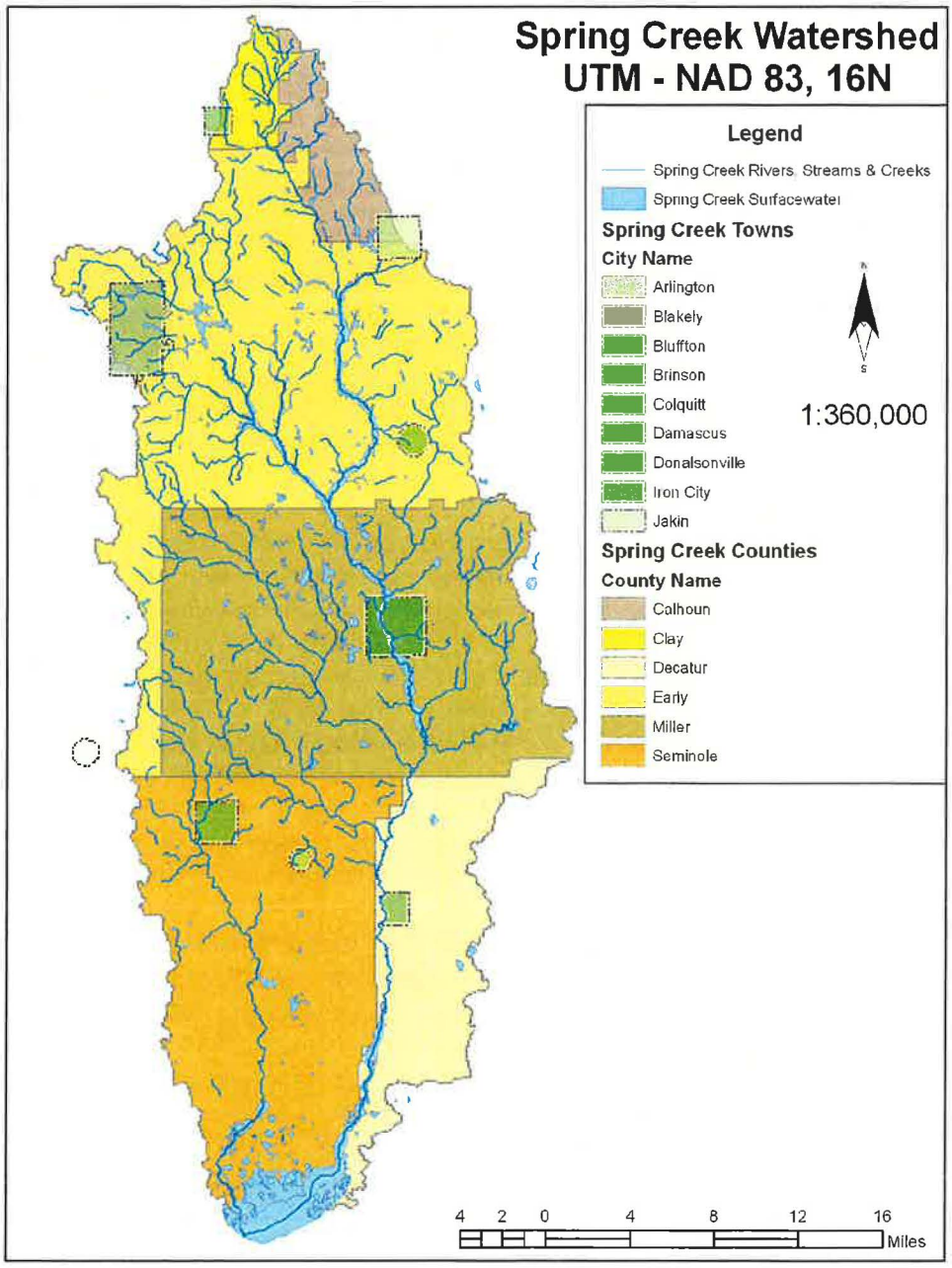
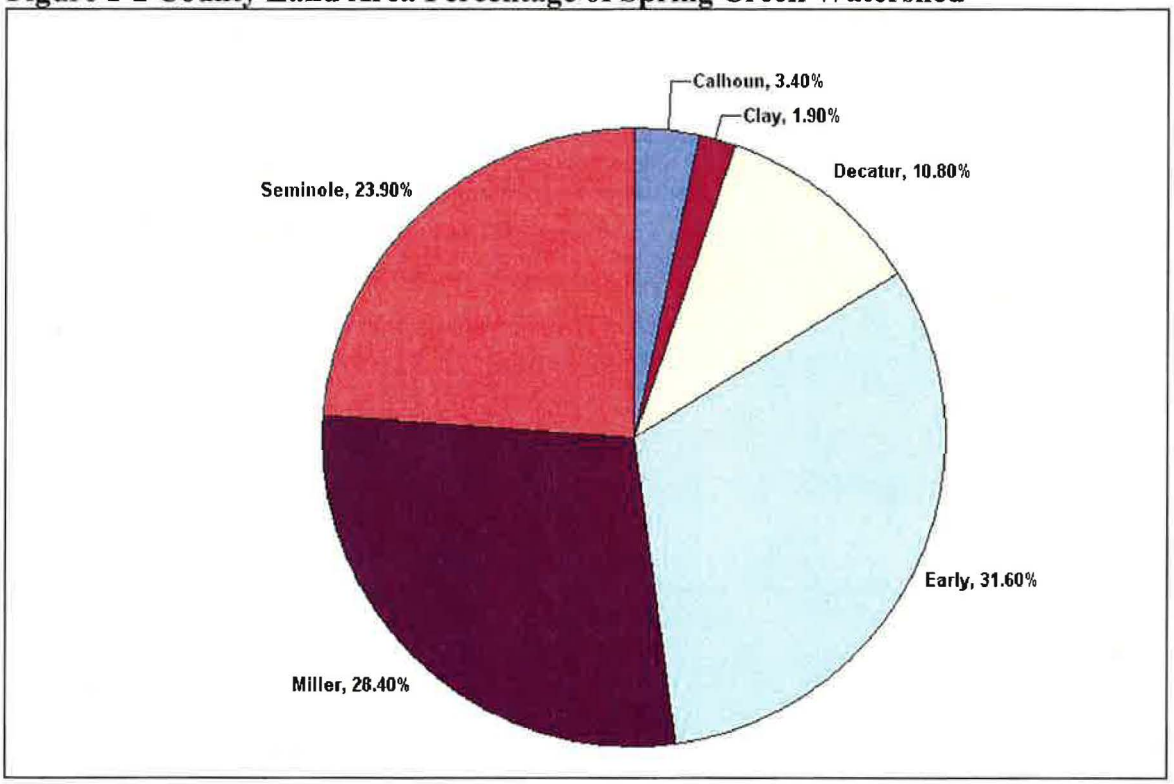


Figure 1-2 County Land Area Percentage of Spring Creek Watershed



1.1 Protected Species in the Spring Creek Watershed

The wide assortment of habitat types in the Spring Creek Watershed harbor a wondrous diversity of plants and wildlife. Unfortunately, habitat loss, sedimentation, and various other factors have put many of these species unique to our region in peril. According to the Endangered Species Act of 1973, Congress found and declared that:

> "(1) various species of fish, wildlife, and plants in the United States have been rendered extinct as a consequence of economic growth and development untempered by adequate concern and conservation; (2) other species of fish, wildlife, and plants have been so depleted in numbers that they are in danger of or threatened with extinction; (3) these species of fish, wildlife, and plants are of aesthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people."

As a result of the value and federal protection of these rare creatures, all practical measures should be taken to assure that human activities and disturbances do not in any way threaten their continued survival. Local regulations must be established and enforced to sufficiently protect the shrinking habitats of these species. The above approach will be most successful if implemented in association with an outreach and education campaign targeting citizens and members of local governing bodies. The following table is a record of the plants and animals listed as endangered or threatened at the state and federal levels, as updated in 2004 by the USFWS-Georgia Ecological Services (Athens, Brunswick, and Columbus).

Table 1-1 Protected Plant and Animal Species in the Spring Creek Watershed

Threatened and Endangered Plants and Animals in the Spring Creek Watershed *(Clay, Calhoun, Early, Miller, Seminole, and Decatur Counties)*				
Species	**Federal Status**	**State Status**	**Habitat**	**Threats**
Bird				
Bald Eagle *Haliaeetus leucocephalus*	T	E	Inland waterways and estuarine areas in Georgia	Major factor in initial decline was lowered reproductive success following use of DDT. Current threats include habitat destruction, disturbance at the nest, illegal shooting, electrocution, impact injuries, and lead poisoning.
Red-cockaded Woodpecker *Picoides borealis*	E	E	Nest in mature pine with low understory vegetation (<1.5m); forage in pine and pine hardwood stands >30 years of age, preferably > 10" dbh.	Reduction of older age pine stands and the encroachment of hardwood midstory in older age pine stands due to fire suppression.
Wood Stork *Mycteria americana*	E	E	Primarily feed in fresh and brackish wetlands and nest in cypress or other wooded swamps.	Decline due primarily to loss of suitable feeding habitat, particularly in south Florida. Other factors include loss of nesting habitat, prolonged drought/flooding, raccoon predation on nests, and human disturbance of rookeries.
Reptile				
Alligator Snapping Turtle *Macroclemys temminckii*	No Federal Status	T	Rivers, lakes, and large ponds near stream swamps.	Destruction and modification of habitat and overharvesting.
Barbour's Map Turtle *Graptemys barbouri*	No Federal Status	T	Restricted to the Apalachicola, Chipola, Chattahoochee, and Flint Rivers in eastern Alabama, western Georgia, and western Florida.	
Eastern Indigo Snake *Drymarchon corais couperi*	T	T	During winter, den in xeric sandridge habitat preferred by gopher tortoises; during warm months, forage in creek bottoms, upland forests, and agricultural fields.	Habitat loss due to uses such as farming, construction, forestry, and pasture and to overcollecting for the pet trade.
Gopher Tortoise	No Federal	T	Well-drained, sandy soils in forest and grassy areas;	Habitat loss and conversion to closed

Gopherus polyphemus	Status		associated with pine overstory, open understory with grass and forb groundcover, and sunny areas for nesting.	canopy forests. Other threats include mortality on highways and the collection of tortoises for pets.
Amphibian				
Flatwoods Salamander *Ambystoma cingulatum*	T	T	Adults and subadults are fossorial; found in open mesic pine/wiregrass flatwoods dominated by longleaf or slash pine and maintained by frequent fire. During breeding period, which coincides with heavy rains from Oct-Dec, move to isolated, shallow, small depressions (forested with emergent vegetation) that dry completely on a cyclic basis. Last breeding record for Early County was in the 1940's.	
Invertebrate				
Gulf Moccasinshell Mussel *Medionidus penicillatus*	E	E	Medium streams to large rivers with slight to moderate current over sand and gravel substrates; may be associated with muddy sand substrates around tree roots.	Habitat modification, sedimentation, and water quality degradation.
Oval Pigtoe *Pleurobema pyriforme*	E	E	River tributaries and main channels in slow to moderate currents over silty sand, muddy sand, sand, and gravel substrates	Habitat modification, sedimentation, and water quality degradation.
Shinyrayed Pocketbook *Lampsilis subangulata*	E	E	Medium creeks to the main stems of rivers with slow to moderate currents over sandy substrates and associated with rock or clay.	Habitat modification, sedimentation, and water quality degradation.
Fish				
Bluenose Shiner *Pteronotropis welaka*		Rare	Quiet backwaters and vegetated pools of streams and rivers.	
Bluestripe Shiner *Cyprinella callitaenia*	No Federal Status	T	Brownwater streams.	
Redeye Chub *Notropis harperi*		Rare	Springs and spring influenced creeks over sand or rocky substrates.	
Plant				
American Chaffseed	E	E	Fire maintained wet savannahs in the Coastal	Fire suppression, habitat conversion, and

Schwalbea americana			Plain (with grass pinks, colic root, huckleberry and gallberry); grassy openings and swales of relict longleaf pine woods in the Piedmont.	incompatible agriculture and forestry practices.
Buckthorn *Sideroxylon thornei*	No Federal Status	E	Oak flatwoods where soil normally is saturated for long periods after floods/heavy rains (i.e. calcareous swamps, woods bordering cypress ponds)	
Curtis' Loosestrife Lythrum curtisii	No Federal Status	T	Swamps over limestone, boggy open areas in pinelands, shallow water of wet thickets and floodplains, and occasionally in openings along right-of-ways.	
Harper Fimbry *Fimbristylis perpusilla*	No Federal Status	E	Muddy bottoms and silty margins of drying pine barren ponds and farm ponds.	
Lax Water-milfoil *Myriophyllum laxum*	No Federal Status	T	Sinkholes and other shallow freshwater pools; also sandy clear streams draining spring-fed swamps.	
Narrowleaf Obedient Plant *Physostegia leptophylla*	No Federal Status	T	Wet muck or peat in shallow water of river swamp openings and in the margins of both fresh and brackish (tidal) marshes.	
Pondspice *Litsea aestivalis*	No Federal Status	T	Margins of swamps, cypress ponds, and sandhill depression ponds and in hardwood swamps.	
Relict Trillium *Trillium reliquum*	E	E	Hardwood forests; in the Piedmont, found in either rich ravines or adjacent alluvial terraces with other spring-flowering herbs.	Logging, road construction, agricultural conversion, mining, residential/industrial development, and encroachment by Japanese Honeysuckle and Kudzu.
Variable-leaf Indian Plantain *Arnoglossum diversifolium*	No Federal Status	T	Swamps and muddy stream and river banks	

1.2 Soils Types in the Spring Creek Watershed

Soil and its inherent physical characteristics are an important component to consider when conducting natural resource management and land-disturbing activities. Permeability and erodibility are two factors, in particular, which can potentially influence water quality. According to the USEPA, "groundwater contamination by pollutants such as pesticides and nutrients found in surface releases is affected by the properties of the overlying soil. Soil permeability is one of the controlling factors for the rate at which a contaminant travels through soils. Soils with higher permeability facilitate the transport of pollutants into ground water." (1998) Groundwater contamination is of particular concern in the Spring Creek Watershed because the creek and its tributaries are primarily groundwater fed. Therefore, considerable care must be taken when applying fertilizers, herbicides, pesticides, and other chemicals in locations lacking sufficient buffers from a water body. The ubiquitous sandy loamy soils of the watershed can easily erode. Soil erosion from cropland and unpaved roads contribute an enormous amount of sediment to stream channels throughout the watershed. No-till, conservation tillage, grassed waterways and terraces are just a few ways to prevent damage to the watershed through agricultural soil erosion. County road departments must employ proper road and ditch construction and maintenance techniques to limit the introduction of sediment from these sources. Road managers should be encouraged to attend all available watershed conservation and Best Management Practice (BMP) workshops.

The following tables illustrate the various soil associations present in the Spring Creek Watershed. More detailed soils information can be found in your county's soil survey book, which is a publication of the USDA-NRCS, or on the internet using USDA's Web Soil Survey application. "A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern." (Middleton and Smith, USDA, 1976)

Table 1-2 Spring Creek Watershed Soil's Type and Description by County

Calhoun County Soil Associations
Herod-Muckalee: Poorly drained soils that mainly are loamy throughout, on flood plains.
Meggett-Muckalee: Poorly drained soils that have a loamy surface layer and a clayey subsoil or poorly drained soils that mainly are loamy throughout, on flood plains and stream terraces.
Goldsboro-Grady-Rains: Moderately well drained soils that have a sandy surface layer and a loamy subsoil, in low-lying smooth areas, and poorly drained soils that have a loamy or sandy surface layer and a clayey or loamy subsoil, in depressions and drainageways.
Tifton-Norfolk-Grady: Well drained soils that have a sandy surface layer and a loamy subsoil, on ridgetops and hillsides, and poorly drained soils that have a loamy surface layer and a clayey subsoil, in depressions.
Greenville-Faceville: Well drained soils that have a loamy surface layer and a clayey subsoil, on ridgetops and hillsides.
Faceville-Greenville-Tifton: Well drained soils that have a loamy surface layer and a clayey subsoil or a predominantly sandy surface layer and a loamy subsoil, on ridgetops and hillsides.

Clay County Soil Associations
Red Bay-Greenville-Faceville-Orangeburg: *Well drained, nearly level to gently sloping soils on broad ridges, with sandy or loamy surface layers and loamy or clayey subsoils.*
Norfolk-Marlboro-Bonneau: *Well drained, nearly level to gently sloping soils on broad ridges, with sandy or loamy surface layers and loamy or clayey subsoils.*
Faceville-Carnegie-Orangeburg: *Well drained, nearly level to gently sloping soils on broad ridges, with sandy or loamy surface layers and loamy or clayey subsoils.*
Miller and Seminole Counties Soil Associations
Tifton-Norfolk-Grady: Well drained soils that have a sandy surface layer and loamy subsoil, on ridgetops and hillsides, and poorly drained soils that have a loamy surface layer and a clayey subsoil, in depressions.
Wagram-Troup: Nearly level and very gently sloping, well drained sandy soils that have a brownish or yellowish loamy subsoil.
Lucy-Orangeburg: Nearly level to gently sloping, well drained sandy soils that have a reddish loamy subsoil.
Meggett-Grady: Nearly level, poorly drained and very poorly drained loamy soils that have a grayish clayey subsoil.
Goldsboro-Irvington-Grady: Nearly level, moderately well drained and very poorly drained loamy soils that have a brownish, yellowish, or grayish loamy or clayey subsoil.
Decatur County Soil Associations
Blanton-Bonneau: Nearly level to strongly sloping, well drained to somewhat excessively drained soils that have a thick sandy surface layer, fine- loamy subsoil and occur on upland ridges and side slopes.
Orangeburg-Bonneau-Goldsboro: Gently sloping to strongly sloping well drained soils that have sandy surface and fine-loamy or clayey subsoil and occur on shoulders and side slopes.
Lucy-Blanton-Orangeburg: Nearly level to strongly sloping, well drained to somewhat excessively drained soils that have a thick sandy surface layer, fine- loamy subsoil and occur on upland ridges and side slopes.
Hornsville-Wahee: Nearly somewhat poorly and moderately well drained soils that have sandy surfaces and clayey subsoils and occur in shallow depressions and along drains.
Bigbee-Meggett-Ocilla: Nearly level, poorly drained soils that occur in floodplains and drainageways. Found in a narrow band along Spring Creek.
Early County Soil Associations
Herod-Muckalee: Poorly drained soils that mainly are loamy throughout, on flood plains.
Meggett-Muckalee: Poorly drained soils that have a loamy surface layer and a clayey subsoil or poorly drained soils that mainly are loamy throughout, on flood plains and stream terraces.
Goldsboro-Grady-Rains: Moderately well drained soils that have a sandy surface layer and a loamy subsoil, in low-lying smooth areas, and poorly drained soils that have a loamy or sandy surface layer and a clayey or loamy subsoil, in depressions and drainageways.
Greenville-Faceville: Well drained soils that have a loamy surface layer and a clayey subsoil, on ridgetops and hillsides.
Orangeburg-Red Bay-Norfolk: Well drained soils that have a sandy or loamy surface layer and a loamy subsoil, on ridgetops and hillsides.
Faceville-Greenville-Tifton: Well drained soils that have a loamy surface layer and a clayey subsoil or a predominantly sandy surface layer and a loamy subsoil, on ridgetops and hillsides.
Tifton-Norfolk-Grady: Well drained soils that have a sandy surface layer and loamy subsoil, on ridgetops and hillsides, and poorly drained soils that have a loamy surface layer and a clayey subsoil, in depressions.
Wagram-Norfolk-Orangeburg: Well drained soils that have a sandy surface layer or a sandy surface layer and thick sandy subsurface layer and a loamy subsoil, on ridgetops.

1.3 Population Within the Spring Creek Watershed

Overall population trends throughout the watershed, with the exception of Decatur County, appear to be on the decline. The most likely cause of this decrease is employment. The watershed, and the entire southwest Georgia region, suffers with an unfortunate lack of job opportunities. However, a great deal of effort is currently being directed towards community and economic development in the area. One of the more successful programs is being implemented in the city of Colquitt, Miller County, which features a new film sound stage, annual storytelling plays, and a renovated historic bed and breakfast. Tourism opportunities abound in this rural area of Georgia. Hunting and fishing, quaint small towns with unique shops, historic landmarks, and breathtaking scenery grace the fertile landscape of the Spring Creek Watershed. The following table is a general snapshot of population figures over time in the six counties of the watershed.

Table 1-3 Population of Counties Within Spring Creek Watershed

Spring Creek Watershed Demographics				
County	**2005 Population**	**2000 Population**	**Percent Change: 2000 – 2005**	**Percent Change: 1990 - 2000**
Clay	3,242	3,357	-3.4%	-0.2%
Calhoun	5,972	6,320	-5.5%	26.1%
Early	12,056	12,354	-2.4%	4.2%
Miller	6,228	6,383	-2.4%	1.6%
Seminole	9,226	9,369	-1.5%	4.0%
Decatur	28,618	28,240	1.3%	10.7%

Figure 1-3 Land Use Chart for Spring Creek Watershed

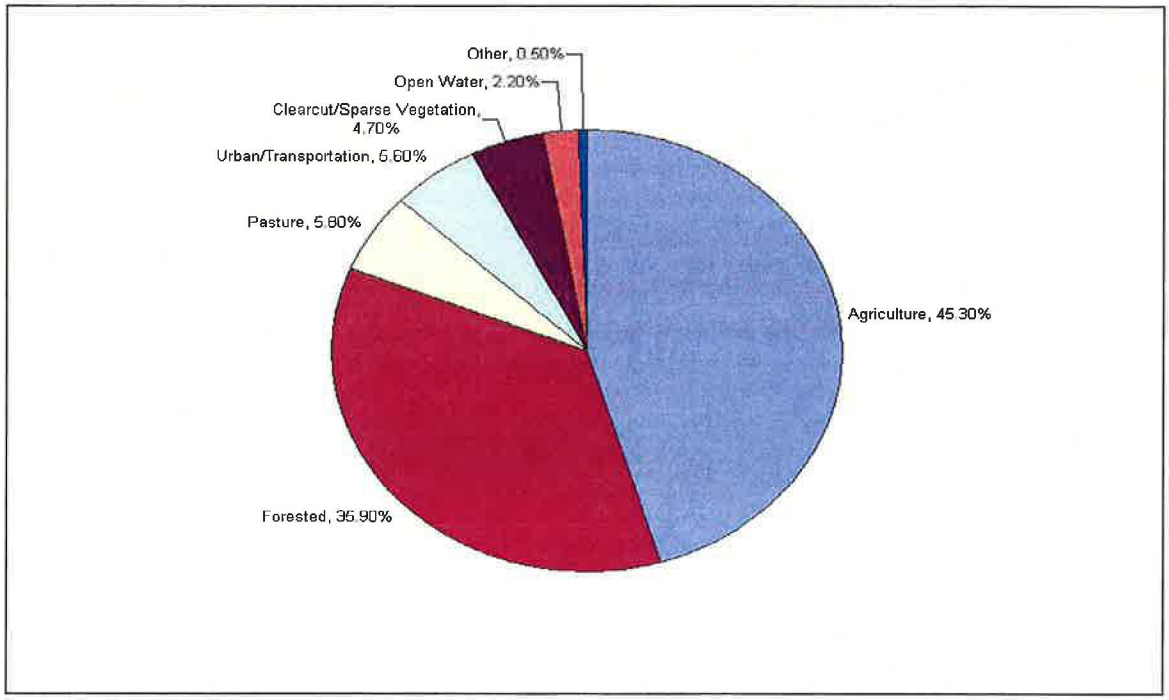


Figure 1-4 Corn Production In Spring Creek Watershed

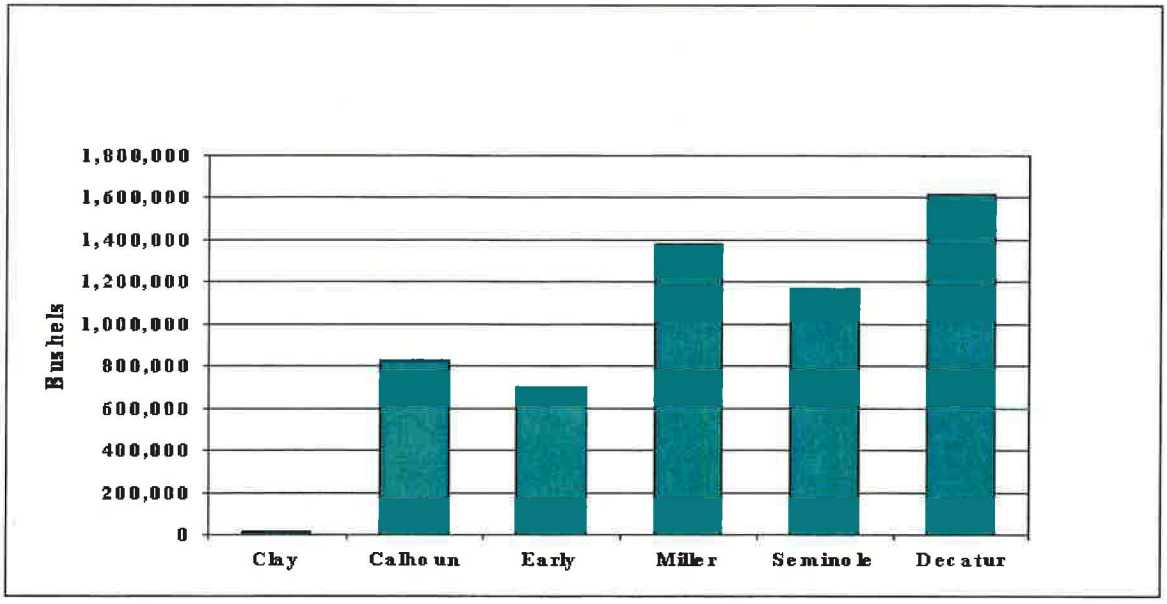


Figure 1-5 Cotton Production in Spring Creek Watershed

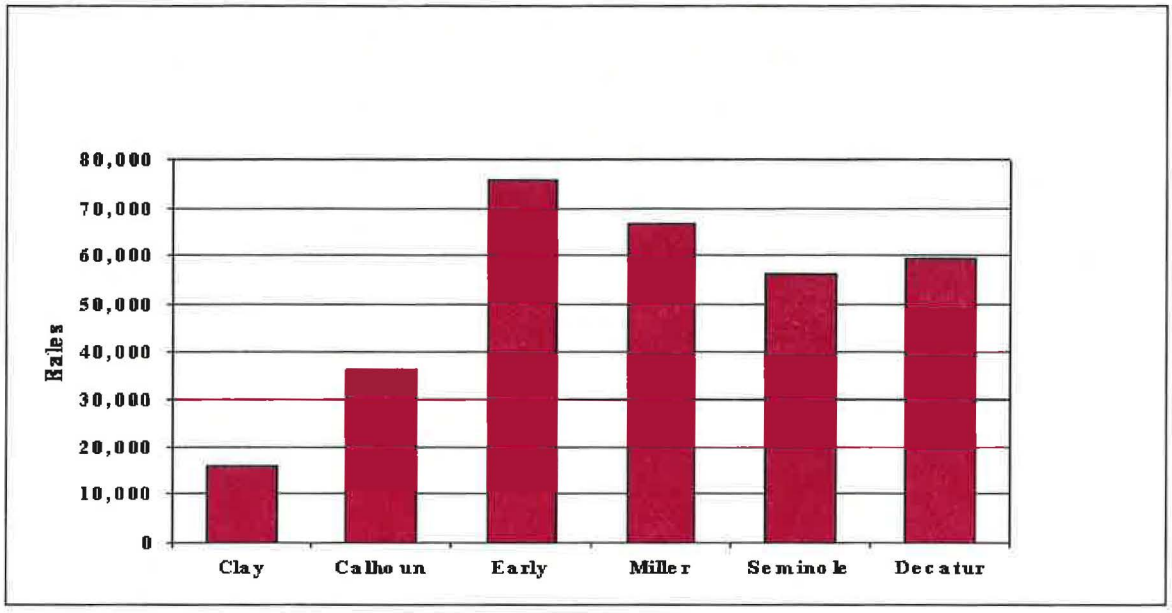
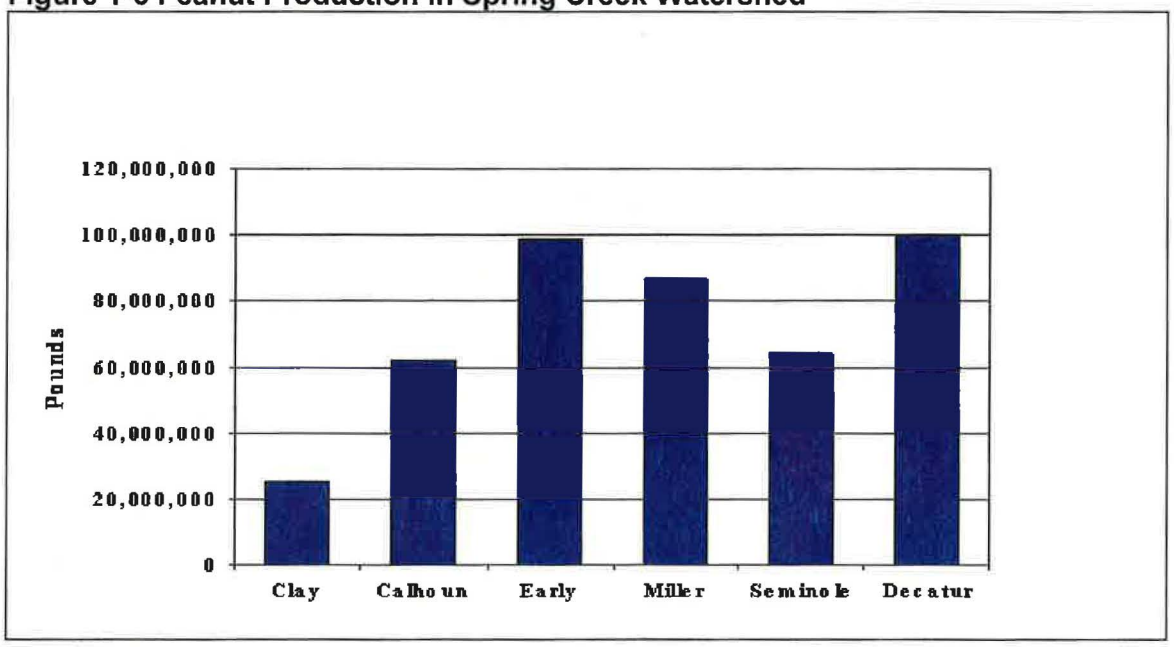


Figure 1-6 Peanut Production in Spring Creek Watershed



2.0 Spring Creek Watershed Conditions

Five sections of Spring Creek Watershed are listed as not supporting or partially supporting on the USEPA's 303d list. These sections are not supporting or partially supporting due to fecal coliform, dissolved oxygen and sedimentation and make up a total of 55 miles of the watershed. The sections are listed in Table 2-1 below with their impairment, miles of impairment and location. See Figure 2-1 for location map of impairments.

Table 2-1 Impaired Watershed Sections

Waterbody (Miles)	County	Location	Impairment
Aycocks Creek 12 miles	Miller	Kaney Head Creek to Spring Creek	Fecal Coliform
Baptist Branch 2 miles	Early	Downstream Blakely	Sediment
Dry Creek 12 miles	Early	Headwaters, downstream Blakely to Spring Creek	Dissolved Oxygen
Fish Pond Drain 7 miles	Seminole	U.S. Hwy 84, Donalsonville to Wash Pond	Dissolved Oxygen
Fish Pond Drain 7 miles	Seminole	U.S. Hwy 84, Donalsonville to Wash Pond	Fecal Coliform
Spring Creek 22 miles	Early/Miller	SR 62 near Arlington to Aycocks creek	Dissolved Oxygen
Spring Creek 22 miles	Early/Miller	SR 62 near Arlington to Aycocks creek	Sediment

Total Maximum Daily Loads (TMDL) have been developed for fecal coliform, dissolved oxygen and sedimentation for impaired sections of the Spring Creek Watershed.

Dissolved Oxygen:

The GAGAEPD has set a daily average for dissolved oxygen of 5.0 mg/L with no less than 4.0 mg/L at all times for waters supporting warm water species of fish 391-3-6-.03(c) (1) (GAGAEPD, 2002). All segments that were reported for dissolved oxygen were limited to headwater streams where drainage areas were relatively small and dry weather flows were low, intermittent or zero. Dissolved oxygen levels usually occur with stream flows less than 10 cubic feet per second. Two naturally occurring activities that greatly affect the amount of dissolved oxygen are adjacent wetland and swamps with organically rich bottom sediments and direct leaf litter fall onto surface waters and adjacent floodplains from overhanging trees and vegetation. Dissolved oxygen levels are also heavily affected by the amount of dissolved oxygen being discharged from NPDES point sources. Table 2-2 shows the level of dissolved oxygen in each impaired segment of the watershed based on point source and non point source impacts and the TMDL for that segment.

Table 2-2 TMDL for Dissolved Oxygen

Stream Segment	Point Source Load (lbs/day)	Nonpoint Source Load (lbs/day)	Total Existing Load (lbs/day)	TMDL (lbs/day)
Dry Creek	1,038	197	1,235	1,121
Fish Pond Drain	465	241	706	593
Spring Creek	1,154	692	2,274	1,936

According to TMDL reporting, NPDES reductions are required to control dissolved oxygen levels in Dry Creek, Fish Pond Drain and Spring Creek. Blakely pond A and B both require a 41% reduction for Dry Creek. Arlington pond #1 requires a 41% reduction and Colquitt WPCP requires a 51% reduction for Spring Creek. Donalsonville WPCP requires a 24% reduction for Fish Pond Drain.

Testing has shown that when water flow is low the dissolved oxygen levels are decreased. The stream flow in Spring Creek has been negatively affected by the irrigating of croplands. Minimum daily stream flow has declined substantially from pre- to post-irrigation periods. Daily stream flow has declined 46% from 43 to 23 cfs. Thirty-day minimum stream flow declined 42% from 58 to 33 cfs.

Fecal Coliform:

Georgia State Water Quality Standards for Fecal Coliform are established in Georgia's Rules and Regulations for Water Quality, November 1996. The criteria for fecal coliform vary depending on the time of year. From May through October the TMDL is a 30-day geometric mean of 200 mpn/100 ml. From November through April the TMDL is a 30-day geometric mean of 1,000 mpn/100 ml with a maximum of 4,000 mpn/100 ml. (The mpn is defined as the most probable number and is equivalent to cfu.) The determination for impairment and inclusion on the Georgia 303 (d) list, more than 20% of the samples had to have a fecal coliform concentration greater than 400 cfu/100 ml.

Two sections of the watershed are impaired by fecal coliform. These two sections are located on Aycocks Creek and Fish Pond Drain making up a total distance of 19 miles. The targeted TMDL for Aycocks Creek is 150 cfu/100ml and the targeted TMDL for Fish Pond Drain is 175 cfu/100ml. The greatest source of nonpoint fecal coliform in a rural setting is associated with diffuse runoff of animal waste associated with the erosion of sediments, runoff from concentrated animal operations, and failing septic tanks. Animal waste runoff is created from direct runoff from feeding operations or through runoff associated with spreading animal waste of agricultural fields.

An agricultural runoff rate of 3.8 in/hr will remove 90% of stored fecal coliform per hour. According to TMDL reporting in 1996 and 1998, in order to maintain the targeted levels of fecal coliform in Aycocks Creek a 60% reduction in loading and/or resultant concentrations from agricultural or pasture land uses is required. In order to maintain the targeted level of fecal coliform in Fish Pond Drain a 30% reduction in loading and/or resultant concentrations from agricultural or pasture land uses is required.

Table 2-3 TMDL for Fecal Coliform

Stream Segment	County	Tested Fecal Coliform (cfu/100ml)	TMDL Fecal Coliform (cfu/100ml)
Aycocks Creek	Miller	330- 490	150
Fish Pond Drain	Seminole	70- >240000	175

Sediment:

The State of Georgia lists the criteria not being met for sedimentation which adds two segments of the watershed to the 303 (d) list as: All waters shall be free from material related to municipal, industrial or other discharges which produce turbidity, color, odor or other objectionable conditions which interfere with legitimate water uses. The two segments of the watershed impaired are Baptist Branch and Spring Creek. Average sediment loads for the impaired sections are 0.72 tons/acre/yr (ranging from 0.42 to 0.99

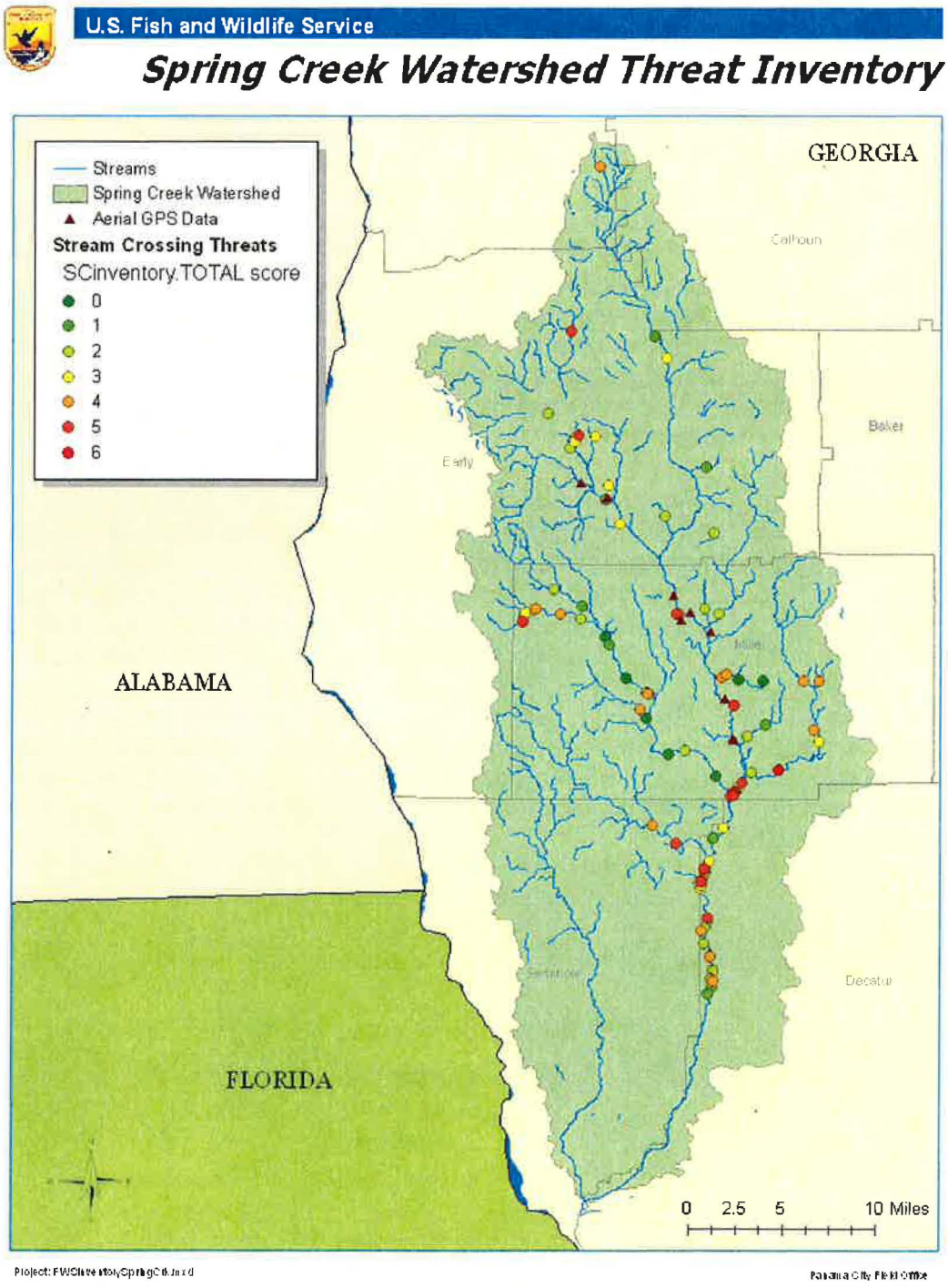
tons/acre/yr) and 1.04 tons/acre/yr (ranging from 0.41 to 1.87 tons/acre/yr). Average sediment loads for the sections of the watershed that are not impaired by sediment are 0.37 tons/acre/yr (ranging from 0.10 to 0.53 tons/acre/yr) and 1.10 tons/acre/yr (ranging from 0.39 to 3.61 tons/acre/yr). The TMDL is based on the average sediment loads for watersheds located within the Chattahoochee and Flint River basins. These average loads are 0.63 tons/acre/yr (ranging from 0.30 to 1.26 tons/acre/yr) and 1.10 tons/acre/yr (ranging from 0.28 to 1.84 tons/acre/yr). Table 2-4 shows the impaired sections and the amount of sediment per year.

Table 2-4 TMDL for Sedimentation

Stream	Current Load (tons/yr)	Total Max Load (tons/yr)
Baptist Branch	1,366	1,366
Spring Creek	52,232	52,232

Currently over ninety percent (90%) of the sediment is from agriculture row crop erosion. Since 1950 there has been a great decrease, 57 percent, in the amount of land being farmed. This reduction in farmland has decreased sediment loads greatly. It is believed that if acceptable levels of sediment are maintained that the impaired segments of the watershed will repair themselves over time. However, with the addition of land being cleared by construction crews for home sites and new business locations if BMPs are not implemented to reduce sedimentation then loading will increase.

Figure 2-1 Impaired water locations



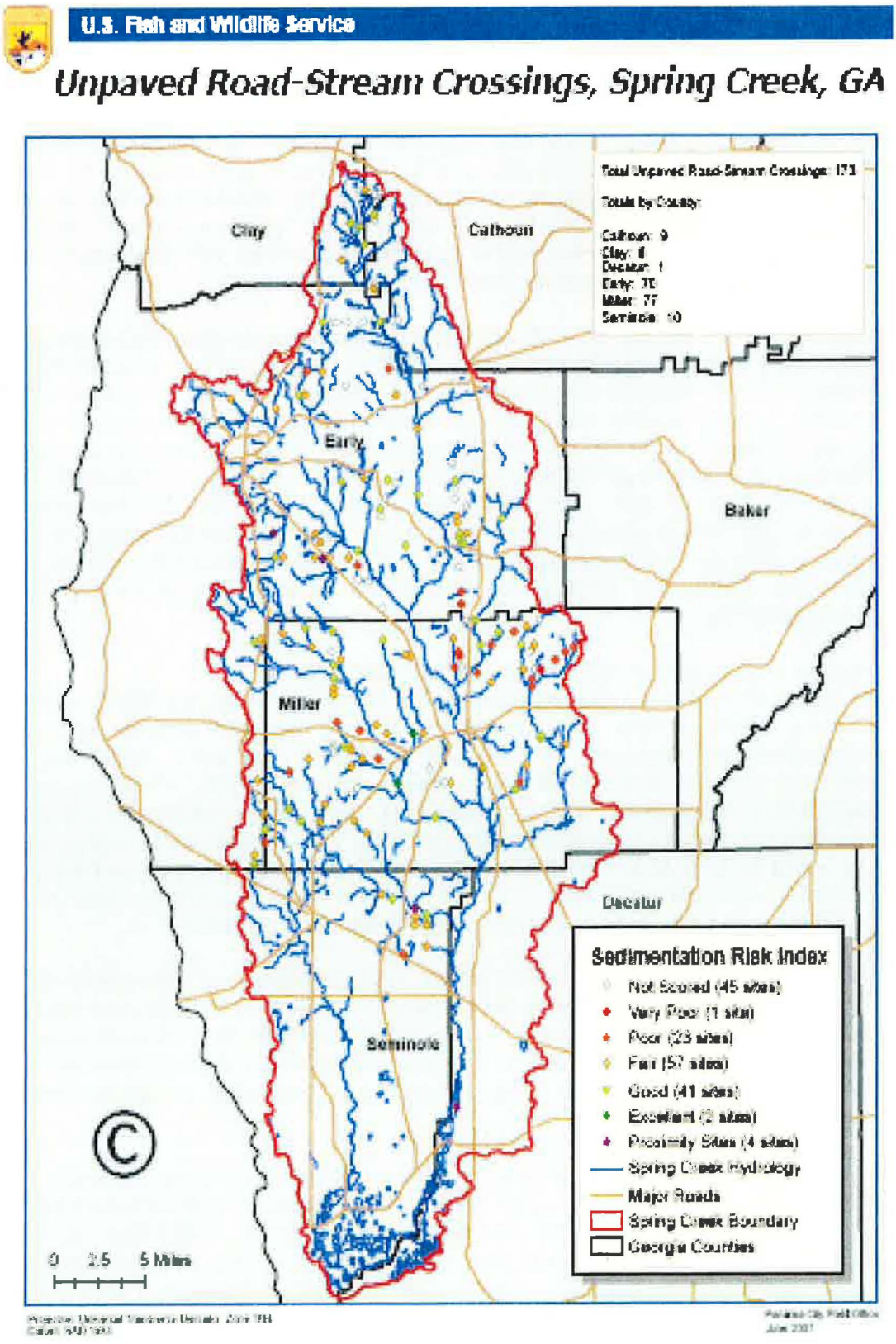
2.1 Condition of Unpaved Road-Stream Crossings

Assessment of County Maintained Unpaved Road-Stream Crossings in the Spring Creek Subbasin of Southwest Georgia by U.S. Fish and Wildlife Service

Unpaved Road-Stream Crossings (UR-SC) have been shown to be major sources of sedimentation in streams, causing significant degradation to aquatic habitat. For this study, 233 potential UR-SC sites located in the Spring Creek subbasin (HUC 03130010) were identified using a GIS analysis. Sites in Fishpond Drain were excluded from the analysis. From 17 January 2007 to 21 February 2007, a detailed field survey of county maintained UR-SC sites was conducted according to procedures set forth in the Northwest Florida Unpaved Road-Stream Crossing Manual (Fish and Wildlife Service, 2005). Of the 233 potential sites, 173 UR-SC sites were validated in the field. Sites were eliminated due to recent road paving, crossing removal or lack of waterway. Of the 173 sites verified in the field, 124 were analyzed for risk of sedimentation. The other sites were not analyzed for sedimentation threat because they were proximate to a nearby stream without crossing the waterway or were determined to be largely artificial agricultural drainage features.

Following field data collection, UR-SC sites were scored and ranked according to the Sedimentation Risk Index (SRI) developed by Witmer (2007). The SRI considers three factors: soil erodibility, road hazard and stream alteration. The factors are composed of 12 individual metrics given a score of 1 (poor), 3 (fair) or 5 (good) with possible score range from 12 to 60. For this study, the 124 ranked sites were between 24 and 56. One site was scored Very Poor (12-24), 23 sites were scored Poor (25-36), 57 sites Fair (37-45), 41 sites Good (46-54) and 2 sites Excellent (55-60). Sites with low scores generally exhibited roads with loose surfacing, false ditches, runoff carrying directly into waterways, and poorly designed or maintained crossing structures. Sites with high scores generally exhibited compact aggregate road surfacing, vegetated roadside drains without direct delivery of runoff into waterways, and crossing structures causing minimal impairment of the waterway.

Figure 2-2 Unpaved Road-Stream Crossings in the Watershed



3.0 Nonpoint Source Management Measures for Implementation

The Spring Creek Watershed Partnership (SCWP) will guide the implementation of the Spring Creek WMP. The SCWP was forged in 2003 for the purpose of addressing water quality concerns in the Spring Creek Watershed. Steering committee members include state and county officials, natural resource experts from private, state and federal agencies and local landowners. To date, the SCWP has overseen several projects aimed at limiting nonpoint source pollution from agriculture lands. Specifically, Laurel Bush Springs, a major spring flowing into Spring Creek, was restored by removing hundreds of cubic yards of sediment in December 2004. Riparian fencing installations have excluded approximately 10,000 ft of stream from livestock access. Additionally, U.S. Fish and Wildlife has conducted a qualitative survey of 105 sites throughout the watershed, providing a reference for identifying critical areas.

Historic and current resources uses within the watershed were evaluated to recommend specific management strategies. The USFWS conducted a preliminary threat assessment for Spring Creek, which identifies high-risk areas. After refining this information, priority sites were identified in the map form and distributed at SCWP meetings. These sites will be targeted for installation of BMPs. Surveys conducted by the Georgia Department of Natural Resources, Wildlife Resources Division (GAWRD) gave an account of fish and reptile populations supported by the watershed. Additionally, USFWS identified endangered mussel ranges within the watershed. Other information sources that have been utilized include the National Land Cover Dataset (NLCD), the 303(d) and 305(b) lists maintained by the Georgia Natural Heritage Program (GANHP).

3.1 Implementation of Best Management Practices (BMPs)

Using recommended restoration goals identified for priority areas, the WMP will focus on establishing BMPs in these areas so as to decrease nonpoint sources and continue educational/outreach activities throughout the watershed community. BMPs will include but not be limited to livestock exclusion, stream channel stability, runoff management, erosion control, and irrigation water management. The Natural Resources Conservation Service and the Project Coordinator will work with willing landowners in high risk and priority areas to alter their land management and operating practices to help improve water quality within the watershed. The BMPs will be installed under the guidance of the Natural Resource Conservation Service using its specified guidelines.

Livestock exclusion BMPs focus will be on removing livestock from sensitive areas within the Spring Creek Watershed. BMPs for livestock exclusion will include installing fencing to limiting or eliminating livestock access to creeks, streams and wetland areas. Well installation, piping and water troughs will be installed to provide an alternative water source to livestock. Heavy use areas will also be constructed to reduce runoff from livestock areas.

Runoff management and erosion control BMPs will be used to target sedimentation reduction within the watershed. The number one cause of sedimentation within the watershed is runoff from row crop operations. Some of the BMPs that will be used include filter strips along field edges, critical area planting and the conversion of row crop land into pasture or grazing land. Planting cover crops in sensitive areas will greatly reduce the runoff and erosion associated with row crop operations. Infiltration devices will be used to reduce runoff in rural area subdivisions and on unpaved roads. Stream

bank stability and stream bank protection BMPs such as planting trees and restoring stream banks will be used to reduce erosion along the banks within the watershed.

Irrigation water management BMPs will be installed in order to improve irrigating efficiency throughout the watershed. This will be accomplished by converting high pressure systems with conventional type spray nozzles to low pressure irrigation systems with drop nozzles and rotator type spray heads.

3.2 Nonpoint Source Monitoring

A monitoring program will be developed to track and evaluate the effectiveness of the BMPs and other restoration initiatives and will be designed to focus on tracking the levels of dissolved oxygen, fecal coliform and sediment. Also, a watershed assessment will be conducted once a year to track changes in the land uses that may be contributing sediment and nutrient loading.

3.3 Education and Outreach

Education and outreach programs are essential to educate citizens about water quality and aquatic habitat impairments. Additionally, they serve to increase the visibility of the SCWP, thus encouraging participation and support from the public. The WMP provides for continued outreach and education to increase public awareness of Spring Creek and encourage membership in the SCWP. Outreach and education will be done through the implementation of BMPs, BMP field days to promote conservation methods, quarterly Spring Creek Partnership meetings, quarterly Spring Creek Partnership newsletters, Rivers-Alive clean up events and Adopt-A-Stream workshops.

4.0 Estimated Load Reductions

4.1 Region 5 Model 05 Load Reduction Model

The Region 5 Model 05 Load Reduction model will be used to estimate the load reducing effects created by the installation of planned BMPs. The model uses the pollutants controlled calculation and documentation for section 319 watershed training manual. The program is segmented into five different BMP categories for estimation of load reductions. These categories are gully stabilization, bank stabilization, agricultural fields, feedlots and urban runoff. Many different subcategories are listed under each category. The program only gives an estimation of load reduction and makes many assumptions in doing so. Load reduction calculations are given for sedimentation, phosphorus and nitrogen. Monitoring is the only true way to determine actual load reductions achieved by BMP installations.

4.1.1 Load Reduction Methodology

1) The Region 5 Model does not allow any calculations for water saving from conducting irrigation retrofit BMPs. NRCS numbers estimate the average water savings from converting from conventional irrigation spray nozzles to low pressure drop nozzles is 2 inches per acre per year.

2) The Region 5 Model does not allow any calculations for energy savings on irrigation retrofit BMPs. Energy savings will not be used in the load reduction reporting. Do note that considerable energy savings are gained through irrigation retrofits from conventional spray to low-pressure drops.

3) The load reduction model requires the input of a soil rainfall/runoff erosivity number, or "R" value, for load reduction estimations. Within the six counties in the watershed there are five different soil erosivity "R" values according to the RUSLE values. Clay and Calhoun counties have a 390 "R" value, Early County has a 420 "R" value, Miller County has a 425 "R" value, Seminole county has a 440 "R" value and Decatur County has a 430 "R" value. An "R" value of 425 will be used during the load reduction calculations to represent an average "R" value.

4) The load reduction model requires that a soil erodibility factor, or "K" factor, is used to estimate load reductions. Soils within Georgia have "K" values that range from 0.05 to 0.49. The majority of the soils within the watershed are medium textured soils, such as silt loam and have "K" values from 0.25 to 0.40. An average "K" value of 0.33 will be used to calculate load reduction values.

5) A length of slope and steepness factor, or "LS" factor, is required to calculate load reduction values. The "LS" value is a site specific value that must be calculated from each BMP site. Most crop lands in Georgia have slope lengths that range from 60 to 250 feet. For load reduction calculations an average of 150 feet for slope length and an average of 5% slope will be used. This will be a "LS" factor value of 0.76.

6) The Region 5 Model requires a cover management factor, "C" factor, in order to calculate load reductions. The program automatically inserts a "C" value into the calculation based on the county in which the BMP is installed. "C" factor values range from 0.20 to 0.31 in the six counties within the watershed. An average value of 0.28 will be used in the load reduction calculations.

7) The Region 5 Model requires a support practice factor, or "P" factor, to calculate load reductions. The model automatically inserts a "P" factor based on the county selected. The six counties within the watershed have "P" factors that range from 0.95 to 1.00. A "P" value of 1.00 will be used to calculate load reductions.

8) The Region 5 Model gives an estimated soil lost per year in tons/acre/yr. Each of the six counties within the watershed has different soil loss estimations according to the model. The six counties range from 4.12 to 13.87 tons/acre/yr for soil loss. A number of 5.35 will be used to calculate load reductions.

9) For livestock exclusion calculations the model requires a number of livestock (and weight classes on some livestock such as cattle) to be excluded. The number will be estimated at 200 head per site since the exact number of livestock to be excluded is not known. It will be estimated that there will be 100 head of livestock at a design weight of 500 lbs. each and 100 head of livestock at a design weight of 1,400 lbs. each. The acreage affected by runoff will be estimated at 10 acres per site for a total of 40 acres. It is estimated that 500 feet of stream bank will be effected per BMP site.

10) The BMPs to be completed are an estimate based on applications that have been filled out by landowners and shareholders. The BMP installation sites are subject to landowner participation.

11) Urban runoff calculations do not show an estimation for sedimentation, phosphorous and nitrogen. Urban runoff calculations are needed to calculate load reductions for

rural area subdivisions and dirt roads. The Gully Stabilization calculations will be used to estimate load reductions for these areas.

4.2 BMPs targeted to be Completed for Load Reduction Calculations During the Three Year Period From September 2007 to September 2010 by the Spring Creek Watershed Partnership's Efforts.

The following table is an estimation of the BMPs that will be completed over a three-year period. The table contains an estimated number of acres that will be affected or a number of livestock to be excluded. Completion of the BMPs will depend heavily on landowner participation and desires. The figure for BMPs in each category may change depending upon the type and number of BMPs each landowner's commitment.

Table 4-1 BMP Type and Critical Number Affected

BMP Type	Number to be Completed	Critical Number Affected
Livestock Exclusion	4	200 head per BMP = 800 total livestock excluded, 2000 ft. of stream bank protected
Irrigation Retrofits	15	81 acres per system average at 2" per acre savings = 1215 acres total
Critical Area Planting/Grassed Waterway	4	Average of 5 acres per BMP = 20 acres total
Heavy Use Areas	4	¼ acre average per BMP or 1 acre total
Stream Channel Stability	3	0.25 miles per BMP = 0.75 miles
Filter Strips	3	1 Acre area for each BMP or 3 acres
Infiltration Devices	3	5 ft at top width and 2 ft at bottom width with a depth of 1.5 ft and 100 ft long each
Stream Bank Protection	4	100 ft x 30 ft each BMP or 0.069 acres = 0.275 acres

4.3 BMP Installation Load Reduction Estimations for Three Year Spring Creek Watershed Partnership's Efforts

4.3.1 Livestock Exclusion

A total of 4 livestock exclusion BMPs are targeted for completion. It is estimated that 200 head of livestock per BMP will be excluded from accessing streams and creeks within the watershed. This is a total of 800 head of livestock that would be excluded. Load reduction estimations are as follows:

Table 4-2 Livestock Exclusion Load Reductions

Pollutant	Loading before BMP	Reduction by BMP	Unit
Sedimentation	NA	42.5	tons/year
Phosphorous	7892	5566	pounds/year
Nitrogen	65119	29389	pounds/year

4.3.2 Irrigation Retrofits

Irrigation retrofits have no major impact on the amount of erosion created through the irrigation of row crops. However, there is a great savings on the amount of water used and the amount of energy used during the irrigation process. Since 40% of the land within Spring Creek Watershed is irrigated the amount of water used can have a great impact on the watershed. Water savings for 15 irrigation retrofits at an average of 81 acres under irrigation is 2 inches per acre per year. This is a total of 66,129,890 gallons of irrigation water saved within the watershed per year. Energy savings are estimated to be $3.00 per inch irrigated per acre. NRCS numbers show that row crops need 18 inches of irrigation per acre. It will be assumed that 10 inches will come through natural precipitation and 8 inches will come from irrigation systems. An energy savings of $29,160.00 per year from the 15 irrigation retrofit BMP sites can be expected.

Table 4-3 Irrigation Retrofit Savings

Resource	Savings by BMP	Unit
Energy	29,160.00	dollars/year
Water	66,129,890	gallons/year

4.3.3 Critical Area Planting and Filter Strips

The same calculation sheet in the Region 5 Model is used for critical area planting and filter strips. Therefore, these two BMPs are combined to show a reduction for both categories. A total of 20 acres for critical area planting and a total of 0.413 acres of filter strips are targeted for BMP installation. Estimated load reduction results are as follows:

Table 4-4 Critical Area Planting and Filter Strips Load Reductions

Pollutant	Reduction by BMP	Unit
Sediment	46	tons/year
Phosphorous	66	pounds/year
Nitrogen	123	pounds/year

4.3.4 Heavy Use Areas

The Region 5 Model had no category for heavy use area improvement. Therefore the BMP was calculated using the Runoff Management calculator in the model. The model showed a reduction for phosphorous but not nitrogen. It can be assumed that the reduction for nitrogen would be the same ratio to phosphorous reduction for heavy use area as it is for livestock exclusion. There are a total of 4 heavy use area BMPs targeted for completion, a total of 0.147 acres. The estimated reductions are as follows:

Table 4-5 Heavy Use Area Load Reductions

Pollutant	Loading before BMP	Reduction by BMP	Unit
Phosphorous	3076	2537	pounds/year
Nitrogen	15378	8765	pounds/year

4.3.5 Stream Channel Stability and Stream Bank Protection

The Region 5 Model uses the same calculations for stream bank stability and stream bank protection. Stream bank stability BMPs are targeted to address 0.75 miles of stream bank within the watershed. It is estimated that the stream stability area will be 20 feet wide for each BMP for a total of 1.82 acres. Stream bank protection BMPs are targeted for 0.275 acres of stream bank. The estimated load reductions are as follows:

Table 4-6 Stream Channel Stability and Bank Protection Load Reductions

Pollutant	BMP Load Reduction	Unit
Sediment	239.8	tons/year
Phosphorus	203.8	pounds/year
Nitrogen	407.7	pounds/year

4.3.6 Infiltration Devices

Infiltration devices will be used to control runoff on unpaved roads. The Region 5 Model calculation does not give sediment, phosphorus or nitrogen load reduction numbers for infiltration devices. Therefore the gully calculation was used to estimate the load reduction for infiltration devices since road ditches somewhat act as gully wash. The estimated load reduction for the targeted 3 BMPs is as follows:

Table 4-7 Infiltration Devices Load Reductions

Pollutant	BMP Load Reduction	Unit
Sediment	14.2	tons/year
Phosphorus	12	pounds/year
Nitrogen	24.1	pounds/year

4.3.7 Total BMP Load Reductions for 3 Year Period

The estimated load reductions for the BMPs to be targeted throughout the Spring Creek Watershed Management Plan will make a positive impact on the water quality within the watershed. While immediate results may not be seen the positive impact should be seen within a few years. Targeted BMPs will be installed on 1237.69 acres, having a positive impact on the entire watershed. The estimated load reductions for all the BMPs combined are as follows:

Table 4-8 Total Load Reductions from BMP Installation for 3-Year Spring Creek Watershed Partnership Program

Pollutant	Load Reduction	Unit
Energy Savings	29,160	dollars/year
Water Savings	66,129,890	gallons/year
Sediment	342	tons/year
Phosphorus	8385	pounds/year
Nitrogen	38709	pounds/year

5.0 Additional BMPs and Conservation Methods to be Applied (2010- 2015)

Additional BMPs and conservation methods will need to be applied in order to reach the level of sediment and nutrient reductions necessary for the Spring Creek Watershed to fully support its designated uses. These additional practices will be conducted through the efforts of the entire stakeholders group. Calhoun, Clay, Decatur, Early, Miller and Seminole Counties will provide technical assistance for addressing unpaved road BMPs and addressing storm water runoff management systems. The Natural Resource Conservation Service will provide technical assistance for agricultural practices, stream bank protection and stabilization engineering assistance and other assistance as needed. The U.S. Fish and Wildlife Service will provide technical assistance with surveys including stream bank stabilization surveys, fish and wildlife surveys, unpaved road surveys and other technical assistance. The remaining stakeholders will provide technical assistance with certain BMP and Conservation methods when needed. The total estimated costs to implement these additional BMPs are $5,939,054 as shown in

Table 5-1. Sources of funding to carryout the implementation of these additional BMPs will be sought from landowners, GAEPD and USFWS grant programs, NRCS EQIP and WHIP programs and from the six counties within the watershed.

Table 5-1 Additional BMPs and Conservation Methods Needed

BMP Type	Critical Number	Estimated Costs
Livestock Exclusion	15 Sites	$3,500.00 per site = $52,500.00
Irrigation Retrofits	310 Sites	$5,500 ea = $1,705,000.00
Critical Area Planting/Grassed Waterway	625 Acres	$2,299 per acre = $1,393,125.00
Heavy Use Areas	15 Sites	Avg. 0.25 acres each = $7,030 ea = $105,450.00
Stream Channel Stability	10 Sites	$3,000.00 per site = $30,000.00
Filter Strips	951 Acres	$328.28 per acre = $312,194.28
Infiltration Devices	50 Sites	$250.00 ea = $12,500.00
Stream Bank Protection	20 Sites	$1,000.00 per site = $20,000.00
Row Crop Conversion to Pasture Land	2000 Acres	$200.00 per acre = $400,000.00
Conservation Tillage	13,515 Acres	Avg. $33 per acre with corn/cotton and peanut rotation = $445,995.00
Planting Cover Crops	23,982 Acres	Avg. $15 per acre with small grain or legume = $359,730.00
Terracing Crop Land	1,325 Acres	At $0.40 per linear foot = $769,560.00
Stream Debris Cleaning *	111 Miles	At $3,000.00 per mile = $333,000.00

* See section 5.1.9. Debris cleaning is to be done in accordance to U.S. Fish and Wildlife Service approval and guidance.

5.1 Load Reduction Estimations for Additional BMPs and Conservation Methods

5.1.1 Additional Livestock Exclusion

A total estimate of 15 additional livestock exclusion BMPs would need to be implemented in the watershed. An estimate of 200 head of livestock per BMP would be excluded from access to the streams and creeks within the watershed. This is a total of 3,000 head of livestock that would be excluded from entering into water bodies within the watershed. Estimated load reductions are as follows:

Table 5-2 Additional Livestock Exclusion Load Reductions

Pollutant	Loading before BMP	Reduction by BMP	Unit
Sedimentation	NA	638	tons/year
Phosphorous	29,545	20,681	pounds/year
Nitrogen	243,796	109,708	pounds/year

5.1.2 Additional Irrigation Retrofits

There are an additional 310 irrigation retrofits that need to be completed throughout the watershed. Water savings for 310 irrigation retrofits at an average of 81 acres under irrigation is 2 inches per acre per year. This is a total of 1,366,684,403 gallons of irrigation water saved within the watershed per year. Energy savings are estimated to be $3.00 per inch irrigated per acre. NRCS numbers show that row crops need 18 inches of irrigation per acre. It will be assumed that 10 inches will come through natural precipitation and 8 inches will come from irrigation systems. An energy savings of $200,880.00 per year from the 310 irrigation retrofit BMP sites can be expected.

Table 5-3 Additional Irrigation Retrofit Savings

Resource	Savings by BMP	Unit
Energy	200,880	dollars/year
Water	1,366,684,403	gallons/year

5.1.3 Additional Critical Area Planting and Filter Strips

The same calculation sheet in the Region 5 Model is used for both critical area planting and filter strips. Therefore, they are combined to show a reduction for both categories. A total of 625 acres for critical area planting and grassed waterways and a total of 951 acres of filter strip BMPs are needed. Load reduction estimations are as follows:

Table 5-4 Additional Critical Area Planting and Filter Strips Load Reductions

Pollutant	Reduction by BMP	Unit
Sediment	5,779	tons/year
Phosphorous	8,030	pounds/year
Nitrogen	16,052	pounds/year

5.1.4 Additional Heavy Use Areas

The Region 5 Model had no category for heavy use area improvement. Therefore, the BMP was calculated using the Runoff Management calculator in the model. The model showed a reduction for phosphorous but not nitrogen. It can be assumed that the reduction for nitrogen would be the same ratio to phosphorous reduction for heavy use area as it is for livestock exclusion. There are a total of 15 additional heavy use area BMPs needed for completion, a total of 3.75 acres. The estimated reductions are as follows:

Table 5-5 Additional Heavy Use Area Load Reductions

Pollutant	Loading before BMP	Reduction by BMP	Unit
Phosphorous	5,165	3,616	pounds/year
Nitrogen	25,826	11,622	pounds/year

5.1.5 Additional Stream Channel Stability and Stream Bank Protection

The Region 5 Model uses the same calculations for stream channel stability and stream bank protection. Additional stream channel stability BMPs are needed to address 2.5 miles of stream bank within the watershed. It is estimated that the stream channel stability area will be 20 feet wide for each BMP for a total of 6.1 acres. Additional BMPs for stream bank protection are needed for 1.38 acres of stream bank. The estimated load reductions are shown in Table 5-6.

Table 5-6 Additional Stream Channel Stability and Bank Protection Load Reductions

Pollutant	BMP Load Reduction	Unit
Sediment	1,632	tons/year
Phosphorus	1,632	pounds/year
Nitrogen	3,264	pounds/year

5.1.6 Additional Infiltration Devices

Infiltration devices will be used to control runoff on unpaved roads. The Region 5 Model calculation does not give sediment, phosphorus or nitrogen load reduction numbers for infiltration devices. Therefore, the gully calculation was used to estimate the load reduction for infiltration devices since road ditches somewhat act as gully wash. The estimated load reduction for the targeted 50 BMPs is as follows:

Table 5-7 Additional Infiltration Devices Load Reductions

Pollutant	BMP Load Reduction	Unit
Sediment	6,024	tons/year
Phosphorus	6,024	pounds/year
Nitrogen	12,049	pounds/year

5.1.7 Additional Row Crop Conversion to Pasture, Conservation Tillage, Planting Cover Crops

The Region 5 Model combines these three practices when calculating estimated load reductions. There are estimated to be 2000 acres of row crop conversion to pasture land, 13,515 acres estimated for conservation tillage and 23,982 acres for planting cover crops in the following load reduction calculations.

Table 5-8 Additional Row Crop Conversion, Conservation Tillage, and Planting Cover Crops Load Reductions

Pollutant	BMP Load Reduction	Unit
Sediment	89,267	tons/year
Phosphorus	127,582	pounds/year
Nitrogen	254,991	pounds/year

5.1.8 Additional Terracing Crop Land

When using terracing on cropland with erosion issues the amount of runoff can be drastically reduced. Often times other practices such as filter strips and grassed waterways need to be used along with terracing. There are 1,325 acres to be terraced in the load reduction estimation calculation.

Table 5-9 Additional Terracing Load Reductions

Pollutant	BMP Load Reduction	Unit
Sediment	4,578	tons/year
Phosphorus	6,007	pounds/year
Nitrogen	12,016	pounds/year

5.1.9 Additional Stream Debris Cleaning

In cooperation with and approval from U.S. Fish and Wildlife Service, unnecessary debris blocking the waterway may be removed. It is estimated that 111 miles of the watershed may have excess debris that is blocking waterways. Storms, beavers and other natural occurrences most often cause these blockages. To ensure that aquatic habitats for macroinvetebrates and feeding and/or spawning areas are not disturbed, and that ecological integrity is maintained, U.S. Fish and Wildlife Service will be asked to supervise any debris cleaning that is determined to be necessary. The county road departments will be primarily responsible for providing manpower in creek and tributary debris removal.

5.1.10 Additional BMP Load Reduction Totals

The additional BMPs are needed in order to have a greater impact on the load reductions for the Spring Creek Watershed. The additional BMPs listed have been totaled in the table below (5-10) to show the positive impact.

Table 5-10 Total Estimated Load Reductions from Additional BMP Installation for Spring Creek Watershed Partnership Program

Pollutant	Load Reduction	Unit
Energy Savings	200,880	dollars/year
Water Savings	1,366,684,404	gallons/year
Sediment	107,918	tons/year
Phosphorus	173,572	pounds/year
Nitrogen	419,702	pounds/year

6.0 Educational Campaign:

One of the key components to the Spring Creek Watershed Management Plan is to educate individuals and organizations within the watershed to be better stewards of the natural resources. One of the main sources of outreach to the community is the Spring Creek Watershed Partnership, which is made up of individuals, concerned citizens and agencies within the watershed. Through the Partnership information on funding and opportunities to implement the Management Plan will be spread throughout the watershed community.

1) Strategy:

The main strategy of the Spring Creek Management Plan is to improve the water quality in the impaired sections of the watershed and protect the water quality in the remaining part of the watershed in order for the entire watershed to be fully supporting. This would allow the watershed to be removed from the EPA's 303 (d) list. The education and outreach will be designed to:

a) Increase public awareness of BMPs and how they are used to protect and improve water quality within the Spring Creek Watershed.

b) Increase public awareness of the ecological significance of the Spring Creek Watershed.

c) Increase public awareness of how farming/land use practices effect the watershed.

d) Increase the public awareness of the endangered and protected species located within the Spring Creek Watershed.

2) Implementation:
The following plan tells what actions will be taken in order to implement the education and outreach strategies. Many of the programs within the NRCS such as EQIP and WHIP (Wildlife Habitat Incentive Program) use the same or similar BMP strategies that the Spring Creek Watershed Program uses. Therefore, the Spring Creek Watershed Program Manager will be working closely with NRCS, Flint River Soil and Water, Georgia Soil and Water, and DNR personnel to implement the education plan. The following strategies will be implemented by:

a) Promoting the implementation of BMPs concerning type, cost and effectiveness.

b) Educating a wide range of ages and audiences concerning water quality.

c) Educating individuals about the vast amount of land that is irrigated within the watershed and how farming practices affect the watershed.

d) Erecting signs educating the public about the watershed and about water quality protection.

e) Educating the public on how septic tanks affect the Spring Creek Watershed's water quality.

The Spring Creek Watershed Program will implement these strategies by using the following plan to educate and reach out to the watershed community.

a) Hold quarterly Spring Creek Partnership meetings. These meeting will be rotated from the six counties involved in order to get more participation from each county. During these meetings the Partnership will be informed about the plan and water quality protection efforts. Individuals will have the opportunity to express specific areas of concern within the watershed.

b) Publish quarterly Spring Creek Watershed news letters "The Water Mark" to all individuals owning property on the watershed and other individuals wishing to receive a copy.

c) Conduct two BMP field days where BMP projects will be viewed and the importance of BMPs and water quality will be discussed. Also ecological concerns and endangered species may be discussed.

d) Publish newsletters through the local newspapers in order to promote activities and events related to the Spring Creek Watershed.

e) Work with school groups and other organizations, such as church RA's, GA's, Girl Scouts and Boy Scouts, to educate on all aspects of the watershed.

f) Eight watershed education signs will be posted on the major highways and roads entering the Spring Creek Watershed. See Figure 6-1 for a picture of the

watershed signs and see Figure 6-2 and Table 6-1 for map and location description of watershed signs.

Two of the programs that the Spring Creek Watershed will be using to educate the public on watershed importance are Adopt-A-Stream and Rivers Alive.

Figure 6-1 Watershed Boundary Signs

Figure 6-2 Watershed Boundary Sign Locations Map

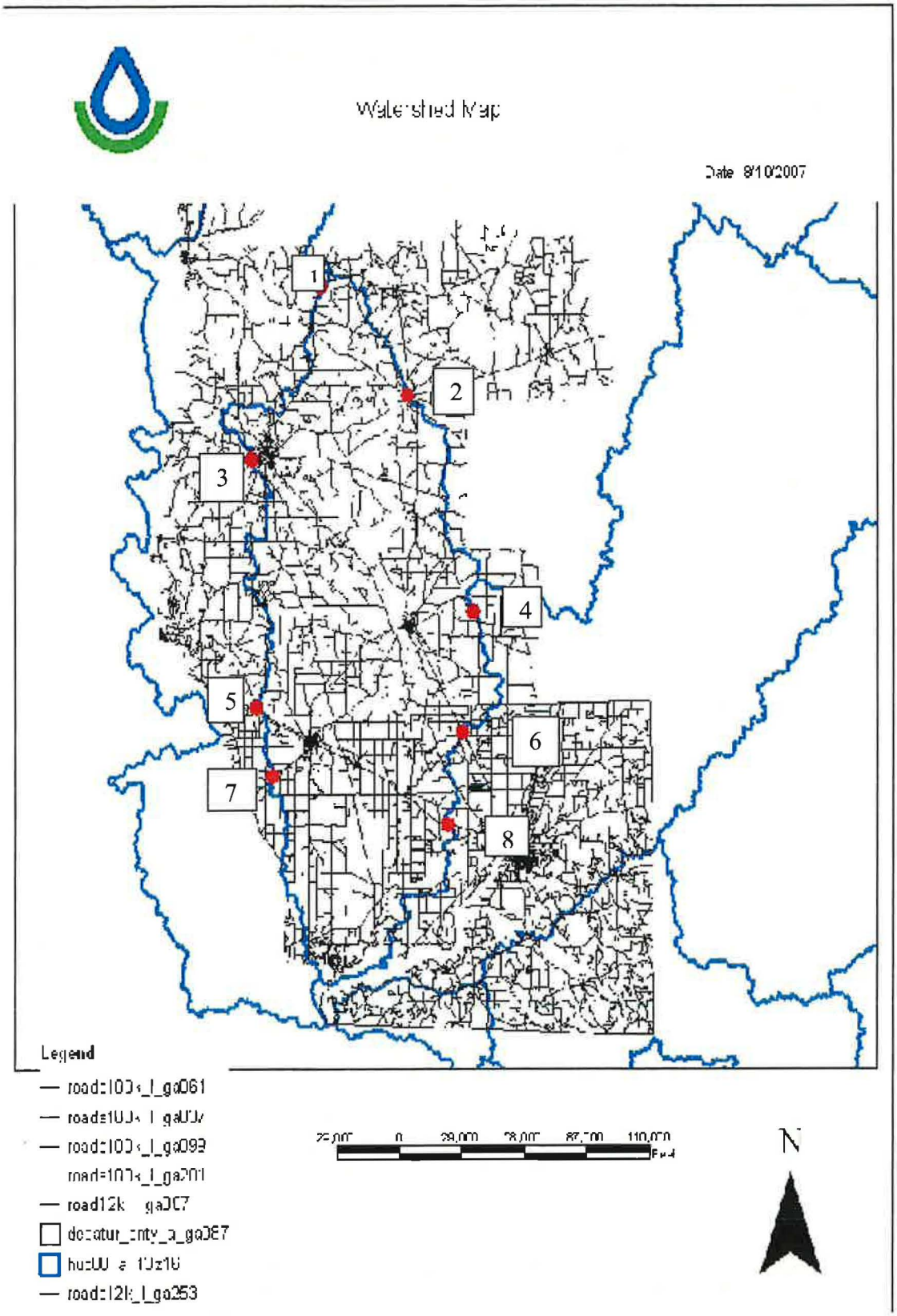


Table 6-1 Watershed Boundary Sign Locations Description

Map Number from Figure 5-2	Description of Location
#1	Hwy 27 S into Bluffton (Clay County)
#2	Hwy 45 W into Arlington (Calhoun County)
#3	Hwy 62 NE into Blakely (Early County)
#4	Hwy 91 S into Colquitt (Miller County)
#5	Hwy 84 E into Donalsonville (Seminole County)
#6	Hwy 27 N into Colquitt (Decatur County)
#7	Hwy 91 N into Donalsonville (Seminole County)
#8	Hwy 84 W into Brinson (Decatur County)

7.0 Monitoring

Chemical and biological water quality monitoring will be conducted in order to measure the effectiveness of the BMPs installed in the Spring Creek Watershed. A short term monitoring program will be conducted by using federal, state, and local goverment water quality data during the three- year project (2007 – 2010). The U.S. Fish and Wildlife Service will conduct yearly biological water monitoring which will include aquatic macroinvertebrate sampling. The Local governments of the six counties within the watershed will conduct quarterly water quality test for sedimentation, phosphorus and nitrogen. This monitoring will not be funded with Section 319(h) Grant funds. Water quality monitoring sites will include those sections of the Spring Creek Watershed listed as impaired according to the GAEPD's 303(d) list. Results from GAGAEPD's 5-year rotational river basin water quality monitoring program will be used in part to evaluate the effectiveness of the implemented BMPs. All water quality monitoring sampling and testing will be done according to an EPA approved Quality Control Plan. Monitoring results will be submitted to GAGAEPD as supporting documentation for load reduction reporting.

Any information generated from Adopt-A-Stream monitoring will also be reported but will be limited on accuracy due to the fact that the individuals conducting the testing are not certified water quality testers. Load reduction reporting will include estimations through the use of modeling programs such as the Region 5 Model 05 program. BMP site locations will be tracked through the use of GIS systems in order to report exact BMP locations for load reduction reporting.

Biological water quality sampling from the U.S. Fish and Wildlife Service and biological and chemical testing through the GAGAEPD's 5-year rotational river basin water quality monitoring program will continue through the 2010- 2015 project outlook.

8.0 Technical and Financial Assistance

Technical and financial assistance will be provided for the Spring Creek Watershed Program through many different organizations. These organizations include the Golden Triangle RC&D Council, Flint River Soil and Conservation District, U.S. Fish and Wildlife Services, Georgia Soil and Water Conservation Services, The Georgia Conservancy, Georgia Department of Natural Resources, The Nature Conservancy, Jones Ecological Research Center, and Miller, Seminole, Decatur, Early, Clay and Calhoun counties.

The NRCS and other organizations will provide technical assistance as previously discussed in Section 3.0. The NRCS will oversee the BMP projects to be certain that

they are completed using the NRCS's certified guidelines. A NRCS representative will provide a final approval form after projects are completed. The NRCS will provide additional support through its programs listed on the NRCS website at http:www.ga.nrcs.usda.gov. These additional resources include but are not limited to Natural Resource Inventory, public service announcements, technical documents and BMP tools and models.

The counties of Miller, Seminole, Decatur, Early, Clay and Calhoun will provide technical assistance to improve unpaved roads in order to reduce runoff and erosion, which is a source of sedimentation within the watershed.

The U.S. Fish and Wildlife Services will also provide technical support as previously described in Section 5.0, provide maps showing high risk areas within the watershed, and conduct yearly biological sampling.

The Flint River Soil and Conservation District, The Georgia Conservancy, The Nature Conservancy, The Georgia Soil and Water Conservation Service and the Jones Ecological Research Center along with the other organizations will provide technical assistance and will also conduct public outreach and educational programs.

Sixty percent of the funding to implement the WMP from 2007 through 2010 will be provided through Section 319(h) FY07 Grant funds and the remaining forty percent will come from the required non-federal matching funds. The GAGAEPD has awarded the Golden Triangle RC&D Council a Section 319(h) FY07 Grant totaling $620,080. The RC&D Council has committed non-federal matching funds totaling $449,800. The non-federal match funding will come through landowner and stakeholder participation and the six participating counties. The GAGAEPD previously awarded the Golden Triangle RC&D Council a Section 319(h) FY01 Grant totaling $300,000 to develop the Spring Creek WMP, educate landowners and the public about the value of using BMPs and work with landowners to implement BMPs. The Golden Triangle RC&D Council committed a total of $200,000 of non-federal funds to the Section 319(h) FY01 Grant project.

The following tables show Section 319(h) budgets for both the development and the implementation of the Spring Creek Watershed Management Plan.

Table 8-1 Section 319(h) FY01 –Grant Budget for the Development of the WMP

Item	Federal Funds	Non-Federal Funds	Total Funds
Funding	$300,000	$200,000	$500,000
Program Manger Salary	$60,000	NA	$60,000
Admin. Assistant Salary	NA	NA	NA
Volunteer Participation	NA	$8,500	$8,500
Fringe Benefits	NA	$21,000	$21,000
Travel	$9,600	$5,400	$15,000
Equipment	$6,000	$4,000	$10,000
Supplies	$2,000	$1,500	$3,500
Education	$10,900	$14,600	$25,500
BMP Installation	$210,000	$140,000	$350,000
Financial Audit	$2,500	$4,000	$6,500
Office Space	NA	$1,000	$1,000

Table 8-2 Section 319(h) –FY07 Budget for the WMP Implementation (2007-2010)

Item	Federal Funds	Matched Funds	Total Funds
Total Funds	$620,080	$449,800	$1,069,880
Program Manger Salary	$94,500	NA	$94,500
Admin. Assistant Salary	$24,000	NA	$24,000
Volunteer Participation	NA	$8,500	$8,500
Fringe Benefits	NA	$33,075	$33,075
Travel	$19,000	$7,500	$26,500
Equipment	$8,300	$5,400	$13,700
Supplies	$3,100	$1,350	$4,450
Education	$8,680	$12,120	$20,800
BMP Installation	$450,000	$375,855	$825,855
Financial Audit	$7,500	$4,000	$11,500
Office Space	$5,000	$2,000	$7,000

As previously discussed in Section 5.0, the estimated costs to implement the additional BMPs (2010- 2015) totals $5,936,054. Additional funds to carryout this objective will be sought from landowners, GAGAEPD and USFWS grant programs, NRCS EQIP and WHIP programs and from the six counties within the watershed.

9.0 Schedule and Milestones for Implementing Management Measures

Short Term Measures

The management measures described in Section 3.0 will be carried out from 11/2007 – 11/2010. However, to fully achieve the goal of delisting the targeted pollutants additional elements (Section 5.0) of the plan will need to be carried out over a much longer period. Table 9-1 shows the activities that will be achieved during this three-year period.

Table 9-1 Implementation Schedule for Project Activities (2007- 2010)

Activity	Schedule			
	2007	2008	2009	2010
Select identified high risk priority areas for BMPs	10/07	10/08	10/09	10/10
Contract with landowners for installation of BMPs	10/07	10/08	10/09	10/10
Install BMPs	11/07	11/08	11/09	11/10
Hold quarterly Spring Creek Watershed Partnership meetings	11/07	2/08, 5/08, 8/08, 11/08	2/09, 5/09, 8/09, 11/09	2/10, 5/10, 8/10, 11/10
Hold Stakeholder meetings		6/08		6/10
Publish and distribute quarterly newsletters to Spring Creek Watershed Partnership	11/07	3/08, 6/08, 9/08,12/08	3/09, 6/09, 9/09, 12/09	3/10, 6/10, 9/10, 12/10
Conduct two BMP field days	11/07		4/09	
Publish newsletters through the local newspapers	12/07	9/08	9/09	10/10
Work with school groups and other organizations	12/07	3/08	5/09	5/10
Conduct chemical sampling		3/08, 6/08, 9/08,12/08	3/09, 6/09, 9/09, 12/09	3/10, 6/10, 9/10, 12/10
USFWS surveys and monitoring	10/07	10/08	10/09	10/10
Calculate load reductions for each completed BMP	10/07	9/08	9/09	9/10
Hold Adopt-A-Stream training courses		2/08	2/09	2/10
Conduct Rivers Alive cleanups		10/08	10/09	10/10
Continue with updates to the SCWP website	11/07	11/08	11/09	11/10

Long Term Measures

The Spring Creek Watershed Management Plan will address educating the public and local organizations on how to protect the water quality within the watershed. The Spring Creek Watershed Partnership will seek to work with stakeholders in addressing watershed issues and resolving those issues. The program presents cost effective BMPs that will improve water quality. However, immediate effects may not be recognized and may require a number of years before the full benefits are seen.

Table 9-2 shows milestones as interim stages of the watershed management plan, which may require changes and updating as the plan is implemented.

Table 9-2: Description of Spring Creek Watershed Milestones

MILESTONE	STARTING DATES	COMPLETION DATES
Negotiate with landowners to Implement BMPs	10/07	10/10
Conduct Public Education and Outreach	11/07	10/10
Develop BMP conservation plans	01/08	11/10
Install first 40 BMPs	10/06	11/10
Update Watershed Management Plan after installing BMPs	11/07	11/10
Conduct Water Quality and Other Monitoring	2/08	10/10
Analyze Water Quality Data to Track Effectiveness of BMPs	9/08	9/10
Obtain GAGAEPD's and Other Water Quality Data	9/08	9/10
Report Load Reductions	9/08	9/10
Install Additional BMPs as listed in Watershed Management Plan	11/10	11/15
Evaluate Progress of Management Measures	9/08	9/10

In order to effectively reduce the level of the targeted pollutants in the water bodies within the watershed, additional BMPs will need to be implemented beyond this three-year period. Table 9-3 shows a proposed schedule to implement additional BMPs and other planed activities.

Table 9-3 Implementation of Additional BMPs (2010- 2015)

Activity	Schedule					
	2010	2011	2012	2013	2014	2015
Contract with landowners for installation of BMPs	11/10	11/11	11/12	11/13	11/14	11/15
Install Agricultural BMPs	12/10	12/11	12/12	12/13	12/14	12/15
Implement BMPs for unpaved roads	11/10	3/11	3/12	3/13	3/14	3/15
Conduct clean up of stream debris	5/10	5/11	5/12	5/13	5/14	5/15
Implement Streambank Stabilization	7/10	7/11	7/12	7/13	7/14	7/15

10.0 Evaluation and Assessment of Progress

The effectiveness of implementing the Spring Creek Watershed Management Plan will be tracked both by qualitative and quantitative measures. Qualitative measures will include records of individual participation in the Spring Creek Partnership meetings, workshops, BMP field days, Adopt-A-Stream training and Rivers-Alive cleanup events. Qualitative measures will evaluate the effectiveness of the education and outreach to the public on conservation issues within the watershed.

Quantitative measures will include the watershed monitoring results as discussed in Section 7.0. These include the US Fish and Wildlife biological monitoring results, GAGAEPD 5-year rotational river basin chemical and biological testing, Adopt-A-Stream testing and chemical testing conducted by local governments. Quantitative evaluation will also consider the load reduction reporting conducted annually in order to measure the amount of loading that is reduced through individual BMP installations.

The Spring Creek Watershed Program Manager will administer and track the progress of implemented management measures, monitor the effectiveness of BMPs and associated load reductions, and completion of tasks and milestones. Progress will be reported to GAGAEPD in semi-annual reports, which will be submitted each February and September. Also for each BMP, load reduction calculations for sediment, phosphorus and nitrogen will be reported as required by GAGAEPD. Load reduction information will also be made available to the NRCS and the Spring Creek Watershed Partnership and its Natural Resource Committee.

The targeted BMP completion number for each type may be altered depending upon the type and number in a landowner's application. BMP completion is greatly dependent on landowner and shareholder participation. If the number of acreage for each BMP type is changed then the estimated load reduction numbers will have to be adjusted. Any changes to the BMP implementation schedule will be reported to the Natural Resource Committee, which acts as the steering committee for the Spring Creek Watershed Partnership.

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