

TMDL Implementation Plan  
for  
Beaver Creek  
in  
Macon County

prepared by  
Middle Flint Regional Development Center

March 31, 2001  
revised  
April 12, 2001

Beaver Creek – Flint River Basin, Macon County  
Upstream Spring Hill Creek  
Background

On the basis of an insufficient number of samples collected in 1992, and subsequently processed employing the most probable number procedure, the northern 4.2 mile segment of Beaver Creek was placed on the 303d list. Collection methodology did not conform to commonly accepted standards concerning fecal coliform sampling of recreational waters. The Flint River Basin Management Plan 1997 includes a statement acknowledging this sampling was not conducted at a sufficient frequency to enable a definitive determination of whether the monthly geometric mean criterion specified in the state water quality standard has actually been violated.

Accepted procedure calls for at least four samples to be collected within a thirty-day period at intervals of not less than twenty-four hours. In the geometric means calculated therefrom, fecal coliforms are not to exceed 200 cfu/100 ml for the months of May through October, and 1000 cfu/100 ml during the months of November through April. Any one sample must not exceed 4000 cfu/100 ml. All nine samples taken at the Beaver Creek collection site met this single-sample threshold. However, in the absence of data sufficient to generate a monthly geometric mean, EPA directed that a 400 cfu/100 ml threshold be applied to samples collected during the months of May-October. Several samples taken from Beaver Creek exceeded this EPA threshold.

Furthermore, the computer model used does not appear to provide adequately for the effects of rainfall. Recent research by Stone Barrett (South Carolina Department of Health and Environmental Control) and Hank McKellar (University of South Carolina) indicate sharp increases in coliform levels, from 200 cfu/100 ml in base flow to >2000 cfu/100 ml in storm flow, were found throughout watersheds with peaks in forested areas. Eight of the Beaver Creek samples were collected during steady state conditions and revealed counts significantly lower than the one collected the day after a minor-to-moderate rain event (.6”).

Despite questionable sampling methodology and modeling parameters, the Beaver Creek TMDL reduction strategy for obtaining and maintaining the fecal coliform target level of 150 cfu/100 ml has been set as a 40% reduction in loading and/or resultant concentrations from agriculture or pasture land uses.

Activity Coincident to Water Quality Sampling Which Led to 303d Listing

A small dairy was located at the very northern extreme of the creek's headwaters in 1992. The only dairy activity possibly affecting the creek would have been low stock rate pasturing on sandy loam soil with a maximum slope of 5%. It would have taken storm flow across this permanent pasture to affect the creek because the cattle did not have access to the headwater. Previous research (Smith, et al.) indicates that pastured watersheds record among the lowest levels of fecal coliform.

One, possibly two livestock operations were present further downstream at the time of water quality testing; one of which was below the Winchester Road water sample collection site, and approximately half of its acreage is located in an adjoining sub-basin. These operations were on predominantly level, sandy/loamy soils with permanent pasture as land cover away from the creek and tributaries. None of the cattle are believed to have had access to the creek or its tributaries. The steepest slopes in the watershed are along the creek/tributary banks, making them the least attractive sites for agricultural activity. Hence, wide, heavily wooded, natural

buffers characterize Beaver Creek and its tributaries. There have not been any animal feed lots located in the drainage basin.

No poultry litter is believed to have been applied to the acreage in question previous to or during the time of water quality sampling.

An important question about the validity of computer modeling relates to the use of county level agriculture data. Macon County has one of the state's larger and most agriculturally diverse economies. In 1992 (coincident with sampling) only ten counties had a higher number of cows and calves, and thirty-five counties had a larger number of commercial broilers. (Pork production was and continues to be an insignificant sector of the local farm economy, with none known to have been present in the sub-basin.) These agricultural activities were not evenly spread across the county, however. The drainage basin has been heavy into row-crop agriculture and peach, pecan and pine production. An analysis of the presence of fecal coliform in Beaver Creek based upon domestic livestock waste generated at the county level would constitute a significant weakness in the computer model.

County landowners have been among the leaders in utilizing the Conservation Reserve Program (CRP) and to a lesser degree the Wetlands Reserve Program (WRP). In 1992 only nineteen Georgia counties had more acres in CRP and WRP than Macon. Whether planted in grass buffers or woodland, the CRP program has the effect of truncating the transport of fecal coliform, which may be in storm wash from farm animal operations, and filtering same before discharge into a source of surface water.

Other possible sources of fecal coliform include leaking sanitary sewers pipes, illicit connections to sanitary sewers, and septic tank seepage. There are not any municipal sanitary sewer systems in the drainage basin, so leaking pipes and illicit sewer connections are not considered here as possible sources. An August, 1989 survey of this watershed revealed nineteen residences were distributed across the  $\pm 4,300$  acre sub-basin. There were not any concentrations of housing and none of the units were located within  $\pm$  five hundred feet of the creek or its tributaries.

The watershed is located in an area of high groundwater pollution susceptibility, a characteristic influenced by such factors as depth to water, net recharge, aquifer media, soils, slope, impact of vadose zone, and hydraulic conductivity. Under normal conditions infiltration is the natural hydrologic flow. While narrative in the TMDL explained that modeling with BASINS and NPSM did account for land use, rainfall, land slope, soil characteristics, etc., there is concern that all of the site-specific factors which facilitate infiltration and reduce storm wash were not addressed adequately or appropriately in the model.

In addition, the sandy soils, which are so prevalent, serve as a natural filter reducing the potential of fecal contamination in the event of hydrologic interaction between groundwater and surface water in Beaver Creek and its tributaries.

### Current Activity

The small dairy at the headwaters ceased operations in mid-decade. More recently a small herd of beef cattle has grazed this acreage, but at the present time they are not present. Since water monitoring was performed one small poultry farm consisting of six houses has located in the watershed, a short distance downstream from the former dairy. In accordance with best management practices poultry litter is removed from the houses at prescribed intervals, covered and stored on site until applied as a soil amendment. The grower sells this material to a farmer

who transports it to a site outside the Beaver Creek sub-basin for land application. Neither landowners nor the County Extension Agent are aware of poultry litter ever being applied to acreage in this sub-basin.

A couple beef livestock herds are still in existence rotating between pastures on sandy/loamy soils, including the larger of the two downstream of the Winchester Road collection site. As was true at the time of the 1992 water sampling, the other land uses are peach, pecan and pine tree production, with the latter having been enhanced by the CRP program. The only significant change in land use since the earlier water sampling is the conversion of several hundred acres from row crop production to a sod farm. None of these other agricultural activities generate fecal matter and none are application sites for poultry litter.

There has not been any residential development in the drainage basin, In fact, the number of residences have decreased since the August, 1989 survey.

### Stakeholder Involvement

Owners of land contiguous to the impaired segment of Beaver Creek were identified from courthouse tax records. Local government officials, Farm Bureau officers and agricultural experts from the County Extension Office and Natural Resources and Conservation Service were also identified. After the mailing of sixteen personalized invitations, some including introductory videocassette tapes, eighteen attended the March 13 meeting. The meeting opened with an explanation of purpose and presentation of background information. During the ninety-minute meeting participants shared their knowledge of possible sources and suggested possible corrective measures.

During the meeting two possible explanations of the “elevated” fecal count were suggested. Winchester Road, the reported collection site, makes two creek crossings two miles apart. Neither of the two crossings, Beaver nor Spring Hill, is identified by name on-site. One or more of the samples mistakenly collected at the wrong creek crossing could have significant effects on overall results.

One lengthy topic of discussion centered on the large number of feral hogs along Beaver. One landowner in the drainage basin reported trapping thirty-six hogs within a recent thirty-day period. A second owner reported killing one hundred during a recent eight months, while a third reported killing three hundred in the recent twelve-month period.

A feral hog population is known to have existed in the sub-basin at the time of the monitoring. Notwithstanding the reports referenced above, little has yet been done to reduce the herd size. With a feral sow capable of producing as many as twenty piglets each year, the herd size could have multiplied many times during the past decade. Local conditions are conducive to such population growth.

Feral hogs are adaptable to almost any habitat, but prefer wooded areas close to water. Lacking sweat glands they regulate body temperature by lying in water or mud and cannot survive in hot climates without a plentiful supply of water. Consequently, it is not surprising that areas of heavy hog use have been previously found to harbor higher concentrations of fecal coliform bacteria (Synatzske).

Their ability to thrive on a diet as diverse as fawns and other young animals, reptiles, amphibians, bird eggs, roots, tubers, berries, acorns, fruits, seeds, pines, fungi, leeches, earthworms, centipedes, insects, fiddler crabs, crayfish, grain, succulent grasses, carrion, and

vegetables gives them a distinct survival advantage over other species. Because they are so adaptable, tenacious, and have no natural predators, it is difficult to control their population. Intensive management requires cooperation among neighboring landowners.

In addition, the largest landowner in this sub-basin operates a hunting preserve on both sides of Beaver Creek. He is cooperating with the Fish and Game Division of the Georgia Department of Natural Resources to tag deer for scientific research. He has also secured a special hunting permit from the Fish and Game Division of the Georgia Department of Natural Resources to hunt feral hogs at night. While he wants to maintain a hog population for recreational hunting, he stated the number of hogs has gotten so large some must be removed for game management purposes.

The feral hog population appears to be larger and nearer the previous water quality testing site than the domestic livestock in the basin. If hogs do prove to be the current major source of fecal, the count may actually exceed the 1992 level.

Beaver Creek – Upstream Spring Hill Creek  
Middle Flint River Basin, Macon County  
Monitoring Plan

The impaired creek segment crosses two public roads, Georgia Highway 49 and Winchester Road, the latter being the previous collection site. The current proposal includes segmented testing, or collecting samples from both locations in an attempt to better identify the possible source(s) of fecal coliform. Samples will be collected and processed in compliance with 40 CFR 136.

Monitor Site #1: Testing will resume at the Winchester Road site. Based on the strength of the resulting analysis of data, necessary corrective actions will be developed. Based on the current assumption that feral hogs are the primary contributor, DNR officials will be instrumental in plan development and implementation. If deemed appropriate, a detailed inventory of domestic livestock herd sizes will be performed before final plans are made. Management or removal practices typically include snaring, trapping, shooting, especially at night, and hunting with dogs. There are currently no toxicants or repellents registered for the control of feral hogs.

If analyses are inconclusive, (1) additional testing may be required at a less accessible site upstream, and/or (2) alternative bacteriological sampling may be required to identify the contributing animal species.

Monitor Site #2: The only agricultural activity generating fecal matter above Georgia Highway 49 is a small, six-house poultry farm. If initial testing identifies excessive microbes at this collection site, the producer and agricultural officials will perform a critical review of the poultry operation jointly. Any weak components of BMPs will be addressed and results monitored.

After analysis of the data from Site #2 a critical site assessment may be necessary because a feral hog population is also known to be the present above this proposed testing site. The small size of this wooded area upstream from the sample site facilitates a visual inventory of conditions along the creek, which should yield information sufficient to approximate the size of the hog population. If the inventory yields significant results a hog removal program will be undertaken to help reduce the presence of fecal coliform, damage to property and dangers to motorists.

### Education

Because of the relatively confined area affected by the feral hog population, education efforts will be targeted toward the few property owners involved. Wildlife agents with DNR will be instrumental in education efforts, which will include the need for cooperation between adjoining landowners.

Georgia Southwestern State University has a history of activism in environmental monitoring; however, the laboratory is not certified. An important component of this plan is to arrange funding necessary to develop a certified lab to facilitate the University's involvement in plan implementation.

### Potential Funding Sources

Watershed Assistance Grants  
Nonpoint Source Implementation Grants (319)  
Water Quality Cooperative Agreements  
Georgia EPD

STATE OF GEORGIA

TMDL IMPLEMENTATION PLAN FOR: BEAVER CREEK FECAL COLIFORM RIVER BASIN: FLINT  
 (STREAM) (PARAMETER) PLAN DATE: March 31, 2001

|  |                          |   |                                     |
|--|--------------------------|---|-------------------------------------|
| Prepared by: <u>Gerald Mixon</u><br><u>Middle Flint</u> Regional Development Center<br>Address: <u>228 West Lamar</u><br>City: <u>Americus</u> State: <u>GA.</u><br>Zip: <u>31709</u> e-mail: <u>gmixon@sowega.net</u><br>Date Submitted to EPD: <u>March 31, 2001</u> |                          | Or Prepared By:<br>Address: _____<br>City: _____ State: _____<br>Zip: _____ e-mail: _____<br>Date Submitted to EPD: _____   |                                     |
| General Information<br>Obtain this information from the TMDL document or other information. When completed, this document will be a self-contained report independent of the TMDL document.  |                          | Significant Stakeholders<br>Identify local governments, agricultural organizations or significant landholders, commercial forestry organizations, businesses and industries, and local organizations including environmental groups with a major interest in this water body.<br><br>Additional stakeholders identified on page 7 |                                     |
| TMDL ID (to be entered by EPD)   | FLT0000002               | Name/Organization   | Macon County Board of Commissioners |
| Water body name  | Beaver Creek             | Address   | P. O. Box 297                       |
| HUC basin name   | Middle Flint River       | City  | Oglethorpe State GA Zip 31068       |
| HUC number   | 03130006                 | Phone   | 478-472-7040 e-mail                 |
| Primary county   | Macon                    | Name/Organization   | City of Oglethorpe                  |
| Secondary county   |                          | Address   | P. O. Box 425                       |
| Primary RDC  | Middle Flint             | City  | Oglethorpe State GA Zip 31068       |
| Secondary RDC  |                          | Phone   | 478-472-6485 e-mail                 |
| Water body location  | Upstream Spring Hill Cr. | Name/Organization   | City of Montezuma                   |
|  | SW of Marshallville      | Address   | P. O. Box 388                       |
| Miles or area impacted   | 4.2 miles                | City  | Montezuma State GA Zip 31063        |
| Parameter addressed in plan  | Fecal coliform           | Phone   | 478-472-8144 e-mail                 |
| Water use classification   | fishing                  | Name/Organization   | Macon County Farm Bureau            |
| Degree of impairment   | Partially supporting use | Address   | P. O. Box 314                       |
|  | Not supporting use X     | City  | Oglethorpe State GA Zip 31068       |
| Date TMDL approved by EPA  |                          | Phone   | 478-472-7588 e-mail                 |
| Impairment due to  | Point sources            | Name/Organization   | Macon County Health Department      |
|  | Nonpoint sources X       | Address   | 100 Sumter Street                   |
|  | Both                     | City  | Oglethorpe State GA Zip 31068       |
| Point source-Form A; Nonpoint source-Form B; Both-Form A+B+C   |                          | Phone   | 478-472-8121 e-mail                 |

Additional stakeholders identified on page 6.

FORM B

SUMMARY OF ALLOCATION MODEL RESULTS FROM TMDL DOCUMENT (existing load, target TMDL, and needed reduction)

| EXISTING LOAD                         | TARGET TMDL   | NEEDED REDUCTION |
|---------------------------------------|---------------|------------------|
| 204 cfu/100ml (summer geometric mean) | 150 cfu/100ml | 54 cfu/100ml     |
|                                       |               |                  |

I. IDENTIFY NONPOINT SOURCE CATEGORIES AND SUBCATEGORIES OR INDIVIDUAL SOURCES WHICH MUST BE CONTROLLED TO IMPLEMENT LOAD ALLOCATIONS:

List major nonpoint sources contributing to impairment including those identified in TMDL document.

| SOURCE                | DESCRIPTION OF CONTRIBUTION TO IMPAIRMENT  | RECOMMENDED LOAD REDUCTION (FROM TMDL) |
|-----------------------|--|--|
| Agricultural pervious | Agriculture or pasture land                | 40%                                    |
| Wildlife              | Large population of feral hogs along creek |  |
|                       |  |  |

II. DESCRIBE ANY REGULATORY OR VOLUNTARY ACTIONS INCLUDING MANAGEMENT MEASURES OR OTHER CONTROLS BY GOVERNMENTS OR INDIVIDUALS THAT WILL HELP ACHIEVE THE LOAD ALLOCATIONS IN THE TMDL:

See the attachment for more instructions.

Existing or required regulatory actions

| RESPONSIBLE GOVERNMENT, ORGANIZATION OR ENTITY | NAME OF REGULATION/ORDINANCE                       | DESCRIPTION  | ENACTED OR PROJECTED DATE (mm/yy) | STATUS             |
|--|--|--|-----------------------------------|--------------------|
| Macon County Board of Comm.                    | Wetland protection ord.                            | Prohibits development in wetland areas   | 02-99                             | active             |
| Macon County Board of Comm.                    | Groundwater Recharge                               | Regulates development in recharge areas  | 02-99                             | active             |
| Macon County Board of Comm.                    | Poultry ordinance                                  | Regulates development of poultry houses  | 03-94                             | active             |
| Macon County Health Dept.                      | State rules and regs. for on-site sewage mgt .sys. | Regulates installation of septic tanks   | 01-98                             | active             |
| GA EPD   | Concentrated Animal Feedlot Operations             | Enforcement of wastewater treatment regulations applicable to feedlot operations | 09-74                             | enforced as needed |

## Existing voluntary actions

| RESPONSIBLE ORGANIZATION OR ENTITY                    | NAME OF ACTION   | DESCRIPTION  | ENACTED OR PROJECTED DATE (mm/yy) | STATUS        |
|---|--|--|-----------------------------------|---------------|
| Ag producers  | Best Management Practices  | Maximizing production without causing deleterious effects on other resources   | 1990s                             | active        |
| Landowners  | Wild game hunting  | Hunting feral hogs for recreational purposes   | 2000                              | active        |
| Landowners  | Wild game hunting and trapping                                       | Hunting and trapping feral hogs for property protection  | 2000                              | active        |
| Landowner   | Special hunting permit   | Permit from DNR to hunt feral hogs at night  | 2001                              | active        |
| Soil and Water Conservation District                  | Promote voluntary adoption of agricultural best management practices | Provide leadership in the protection, conservation, and improvement of soil, water and related resources   | 1937                              | active        |
| USDA Natural Resources Conservation Service (NRCS)    | Environmental Quality Incentives Program and other T/A               | Develop standards and specification regarding conservation practices, animal waste management systems, grazing activities, et.al. – implements state priorities                                      | 1997                              | Needs funding |
| Cooperative Extension Service and Experiment Stations | Disseminate information  | Consultative assistance, information on nonpoint-related impacts on water quality, water quality monitoring, analysis of nutrients and other constituents in animal waste, nutrient management plans | 1914                              | active        |
| Farm Services Agency (FSA)                            | water quality improvement practices (Conservation Reserve Program)   | Administration of cost-sharing and incentive programs for practices that improve environmental quality of farms. Funds targeted for high-priority watersheds with water quality problems.            | 1985                              | active        |
| Georgia Department of Agriculture                     | disease control  | Provides guidance in location of animal waste facilities and disposal of dead animals.   | 1874                              | as needed     |
| USDA Agricultural Research Service (ARS)              | agriculture research and monitoring                                  | Research on grazing land systems and irrigation methods relevant to watershed-scale monitoring projects and nutrient movement in surface water and groundwater.                                      |                                   | as needed     |

|   |                    |   |      |           |
|---|--------------------|---|------|-----------|
| Resource Conservation and Development Council | Volunteer activism | Citizen activism in conservation of natural resources | 1962 | as needed |
|---|--------------------|---|------|-----------|

Additional recommended regulatory or other measures which should be implemented to reduce the loads of the TMDL parameter

| ENTITY/ORGANIZATION RESPONSIBLE       | NAME OF PROPOSED REGULATION/ORDINANCE/ OTHER | DESCRIPTION  | ENACTED OR PROJECTED DATE (mm/yy) | STATUS        |
|---------------------------------------|--|--|-----------------------------------|---------------|
| Georgia Southwestern State University | Laboratory certification                     | University has history of activism in environmental monitoring, but lacks certified laboratory | Year 1                            | Needs funding |
| Landowners                            | Feral hog removal                            | Removal of over-population of feral hogs   | Year 1-2-3                        | Needs funding |

### III. SCHEDULE FOR IMPLEMENTING MANAGEMENT MEASURES OR OTHER CONTROL ACTIONS:

These must be implemented within five years of when the implementation plan is accepted by EPA.

| IMPLEMENTATION ACTION  | YEAR 1 | YEAR 2 | YEAR 3 | YEAR 4 | YEAR 5 |
|--|--------|--------|--------|--------|--------|
| Form stakeholders group  | X      | X      |        |        |        |
| Organize implementation work with stakeholders and local officials to identify remedial measures and potential funding sources | X      |        |        |        |        |
| Identify sources of TMDL parameter   | X      | X      |        |        |        |
| Develop management programs to control runoff including identification and implementation of BMPs (Phase I):                   |        |        |        |        |        |
| Agriculture  | X      |        |        |        |        |
| Forestry   | X      |        |        |        |        |
| Urban  |        |        |        |        |        |
| Mining   |        |        |        |        |        |
| Organize and implement education and outreach programs   | X      | X*     |        |        |        |
| Detect and eliminate illicit discharges  | X      | X*     |        |        |        |
| Evaluate additional management controls needed   |        | X      | X      |        |        |
| Monitor and evaluate results   | X      | X      | X      |        |        |
| Reassess TMDL allocations  | X      | X      |        |        |        |
| Provide periodic status reports on implementation of remedial activities   | X      | X      | X      | X*     | X*     |
| If needed, begin process for Phase II (next 5 years) and subsequent phases   |        |        |        |        | X*     |

\* as needed

### IV. PROJECTED ATTAINMENT DATE AND BASIS FOR THAT PROJECTION:

The projected attainment date is 10 years from acceptance of the implementation plan by EPA.



Describe any planned or proposed sampling activities or other surveys. (Scheduled EPD sampling can be found in the Basin Planning document.)

| ORGANIZATION                                     | TIME FRAME | PARAMETERS     | PURPOSE  | STATUS   |
|--|------------|----------------|--|--|
| EPD  | 2000       | Fecal coliform | basin planning   | underway   |
| Georgia Southwestern State University and/or OMI | Year 1     | Fecal coliform | verify presence of fecal and if necessary perform alternative bacteriological testing to distinguish between possible animal source(s) | Implementation pending plan approval and funding |
|  |            |                |  |  |

VII. CRITERIA TO DETERMINE WHETHER SUBSTANTIAL PROGRESS IS BEING MADE:

- % concentration or load change  
40% reduction in loading and/or resultant concentrations from agriculture or pasture land uses
- Categorical change in classification of the stream  
delisting is the goal
- Regulatory controls or activities installed  
monitor the programs/activities implemented during the five year program
- Best management practices installed  
agriculture – as appropriate, apply BMP tests to identify possible instances of nonconformance

COMMENTS – refer to attachments

Additional Stakeholders from page 1:

|  |   |                        |
|--|---|------------------------|
| Jack L. and Virginia Beville             | William Glenn Johnson, II                 | Andy Page (NRCS)       |
| Cleone David                             | Maggie Kelly                              | Terry W. Parham        |
| Robert H. Griggers                       | William Masee, (Marshallville Mayor)      | Michael C. Parker      |
| Glenn & Dorothy Johnson LP               | William L. and Samuel J. McGehee, Jr.     | Ray C. Pearson         |
| Johnson, Johnson & Johnson Lands LP      | Samuel J. and William McGhee              | Rumph Investments, LLC |
| William Glenn and Dorothy N. Johnson, Jr | Stuart Newberry, (County Extension Agent) | Michael D. Stokes      |