

# IMPLEMENTATION OF A NATURAL RESOURCES CONSERVATION SERVICE WATERSHED DAM PROGRAM – GWINNETT COUNTY, GEORGIA

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**Abstract.** The Natural Resources Conservation Service (NRCS) Watershed Protection and Flood Prevention Conservation Program constructed more than 11,000 flood control dams in 47 states since 1948. Three hundred fifty-seven (357) of those dams were constructed in the State of Georgia. Fourteen (14) of these dams were constructed in Gwinnett County between 1965 and 1980. Gwinnett County's watershed flood control dams provide valuable resources such as flood protection in downstream floodplains, protect roads and bridges, increase property values, provide recreational opportunities, provide fish and wildlife habitats, improve water quality, and protect public utility infrastructure. However, development downstream of the dams has resulted in twelve (12) of the fourteen (14) NRCS dams in the County to be classified as high hazard Category I Dams. Gwinnett County recognizes that the flood control dams are a vital part of our Storm Water Management Program and have initiated a program to bring them into compliance with Georgia Safe Dams Program standards for Category I dams. Implementation of that program has helped Gwinnett County to understand that keys to making it successful are operation and maintenance procedures, understanding the problems and consequences, selecting qualified consultants, long range planning and budgeting, obtaining the support of elected officials, and working closely with the NRCS and cooperating agencies.

## INTRODUCTION

Of the three hundred fifty-seven (357) watershed flood control dams the NRCS constructed in the State of Georgia under the Watershed Protection and Flood Prevention Conservation Program, fourteen (14) were constructed in Gwinnett County between 1965 and 1980. Gwinnett County is a local co-sponsor for each of the dams along with the Gwinnett County Soil and Water Conservation District and the Upper Ocmulgee River Resource Conservation and Development Council.

Gwinnett County is the only one of the co-sponsors that has the ability to collect revenue through taxes. As a result, Gwinnett County is responsible for the continued operation and maintenance and is the primary operator for each of the dams.

In 1977, the Kelly-Barnes dam, a privately constructed and owned earthen dam, failed at Toccoa, Georgia, and thirty-nine (39) people died as a result of the failure. The Kelly-Barnes dam failure led to the Georgia General Assembly to pass the Georgia Safe Dams Act of 1978. Originally, the Safe Dams Act exempted NRCS flood control dams; however, by the 1990's, lawmakers recognized that these dams would experience age related problems and could pose a threat to public safety. As a result, the Safe Dams Act was amended to cease the exemption. The exemption finally ceased on November 1, 2000 (Bramblett, 2004).

All of the fourteen (14) NRCS dams in Gwinnett County meet the criteria of a dam as defined in the Safe Dams Act and fall under the jurisdiction of the Georgia Safe Dams Program (GSDP). Knowing that our NRCS dams were losing their exemption under the Safe Dams Act, Gwinnett County began a Capital Improvement Program (CIP) in 1999 to study and upgrade as necessary each of these dams in order to bring them into compliance with the Safe Dams Act.

## NEED TO UPGRADE

Gwinnett County's NRCS flood control dams were originally designed and constructed to protect agricultural lands from flooding. Floodplains below these dams are reduced as a result of the peak flood attenuation that these dams provide. Over the past few decades, urban development has continued to replace agricultural lands throughout Gwinnett County, and the dams are now protecting this urban development from flooding. Some of this development has been built in the breach zone of the dams; therefore, causing the dam to be classified as a high hazard Category I dam, meaning that

dam failure results in a probable loss of life. Twelve (12) of Gwinnett's fourteen (14) NRCS dams are classified as Category I dams.

Gwinnett County has maintained and operated each of the dams since they were constructed, and each are in very good operating condition. However, most of the dams do not meet the spillway capacity requirements established by GSDP because they were designed prior to the Safe Dams Act to a less stringent design standard. As the operator of these dams, Gwinnett County has the responsibility to bring these dams into compliance with the Safe Dams Act in order to protect public safety.

## VALUABLE RESOURCES

While public safety is the primary reason for bringing our NRCS dams into compliance with GSDP, we recognize that the dams provide valuable resources. As stated before, the peak flood attenuation that each dam provides reduces the floodplain downstream. The dams either control the 100-year flood event without engaging the auxiliary spillway or there is little flow through the auxiliary spillway during the 100-year flood event. The area of usable property adjacent to the floodplain downstream increases as a result of the peak flood attenuation in the reservoir. In addition, the size of bridges required for road crossings over streams downstream of the dams are significantly reduced due to flood attenuation, and public utility facilities are protected from frequent flooding.

The lakes created by NRCS dams provide additional resources. They provide recreational opportunities, fish and wildlife habitats, increased property values, and improved water quality. Gwinnett County has three (3) parks located around four (4) of the dams, and a private golf course is located around one (1) of the dams. Residential developments have been built around or near the remaining nine (9) dams. These communities enjoy the fishing, boating, and swimming opportunities that these dams provide in addition to increased property values. Finally, the reservoirs provide a trap for sediment to be deposited to improve water quality downstream of the dam.

## IMPLEMENTATION OF THE CAPITAL IMPROVEMENT PROGRAM

Gwinnett County initiated the CIP to bring our NRCS dams into compliance with the Safe Dams Act in 1999. At that time, Gwinnett County knew that two (2) of the dams met GSDP standards and required no upgrade to bring them into compliance. Gwinnett County initially began design on one (1) dam per year from 1999 through

2001 with the plan to fund any necessary upgrades with 100% County funds. In November 2000, Congress passed Public Law 106-472, the Small Watershed Rehabilitation Amendments of 2000, which authorized the NRCS to provide 65% of project costs with a local match of 35% to upgrade NRCS flood control dams to bring them into compliance with high hazard standards. With the program already in motion, the County was in good position to receive financial assistance from the NRCS to bring our dams into compliance.

In order to qualify for NRCS grant funds, the dams must not only be designed to meet the spillway capacity requirements of GSDP, but they must be designed to meet NRCS requirements. Under GSDP requirements, spillways must be designed to safely pass a percentage of the probable maximum precipitation (PMP) event under antecedent moisture condition III with freeboard for wave action. The percentage PMP is dependent on the height of dam and volume of flood storage at the top of dam. NRCS guidelines require that the spillway safely pass the full PMP under antecedent moisture condition II with no freeboard requirement.

With three (3) dams under design when the legislation was passed, Gwinnett County immediately focused efforts on designing each of the dams to meet both GSDP and NRCS requirements. The County received a \$1.2 million NRCS grant to upgrade one (1) of the dams, Yellow River Watershed Structure No. 14 (Y14). Y14's construction upgrade was completed in December 2003 for a total project cost of \$1.7 million (\$1.1 million NRCS and \$0.6 million Gwinnett County).

However, the consultant engineer for one (1) of the other two (2) dams determined that it would be more economical for Gwinnett County to fund 100% of project costs and meet only GSDP requirements rather than pay only 35% of project costs and meet both GSDP and NRCS requirements. From that point forward, the County changed strategy of picking out one (1) dam per year to design to evaluating the remaining seven (7) dams for alternatives in order to better plan the CIP. Planning for the remaining seven (7) dams was completed in December 2004. It is estimated that the total program will cost approximately \$18 million.

To date, Gwinnett County has received grants totaling approximately \$6.2 million from the NRCS for four (4) of the dams, including Y14, and have applied for \$3.5 million in grants for two (2) additional dams. The remaining six (6) dams are planned to be structurally upgraded with 100% County funds.

## LESSONS LEARNED

Since the implementation of the CIP to bring all of Gwinnett County's NRCS flood control dams into

compliance with the Safe Dams Act, the County has learned many valuable lessons and are sure that the years to come will offer many more. The following are the keys to a successful program that Gwinnett County has identified:

- 1.) Maintenance of Dams
- 2.) Understand the Problems and Consequences
- 3.) Get the Support of Elected Officials
- 4.) Plan Long Range and Budget
- 5.) Select Qualified Consultants
- 6.) Work with NRCS and Cooperating Agencies

As the primary operator of the NRCS flood control dams, maintenance is very important for public safety if nothing else. Category I dams are inspected by GSDP annually. Gwinnett County has implemented a program to inspect the dams quarterly, operate the gate valves on the principal spillway structure annually, and create work orders for any maintenance items such as removal of debris, mowing, re-vegetation, and removal of woody vegetation from the embankment and auxiliary spillway. Inspection and maintenance are in the best interest of public safety. In addition, they are required for Category I dams under GSDP rules, and dams are required to be up to date in maintenance in order to qualify for the NRCS grant program.

As a public servant, it is very important to understand how the Safe Dams Act applies to flood control dams. By law, if the flood control dam meets the definition of a dam under the Safe Dams Act (height greater than or equal to twenty-five (25) feet or a storage volume greater than or equal to one hundred (100) acre-feet at top of dam), the dam must be brought into compliance with the Safe Dams Act if one (1) or more habitable structures are located in the dam's breach zone. The consequences of doing nothing are to chance a dam failure and/or to be ordered to remove the dam by GSDP. The obvious liability associated with a dam failure is immeasurable. What are not always apparent are the liabilities associated with dam removal. A controlled breach of the dam will remove the hazard, but it will increase flooding downstream, remove recreational opportunities and fish and wildlife habitat, decrease property values, impact roads, bridges, and utility facilities, and decrease water quality.

By understanding the responsibilities, problems, and consequences associated with being the primary sponsor of an NRCS flood control dam, it is important to brief the elected officials. Elected officials have the public's best interest at heart. However, it is difficult to comprehend a storm event of the magnitude that is required for spillway capacity under GSDP regulations. As recent as 1994, Tropical Storm Alberto produced an approximate 50% PMP event on portions of Georgia and many dam

failures occurred across the Georgia. If one can reinforce the benefits and resources that the dams provide in addition to the responsibilities to the public safety and compliance with the Safe Dams Act, one should be able to garner support of elected officials.

Development of a long range capital plan and budget is utterly important. One must determine each dam that is not in compliance with the Safe Dams Act and plan for the most economical alternative that brings the dam into compliance. NRCS grants are available at a 65% NRCS to 35% local cost share ratio; however, as stated previously it may not be economical to upgrade the dam under the requirements of the NRCS grant. If possible, it is best to generate planning reports for all of the NRCS flood control dams in one's jurisdiction in order to plan and budget for the future.

In order to properly plan and develop designs to bring NRCS dams into compliance with the Safe Dams Act, one must select qualified consultants. Under GSDP requirements, only individuals that have been given Engineer of Record status can certify plans submitted to GSDP. It is the opinion of the author that qualifications based selection of an engineering consultant is the best method as opposed to cost based selection.

It is extremely important to work closely and communicate with the NRCS and other cooperating agencies such as the GSDP when planning, designing, and constructing upgrades to an NRCS flood control dam. Even if one's jurisdiction is not applying for an NRCS grant to upgrade a flood control dam, the operation and maintenance agreement for the dam and GSDP requires concurrent approval from the state NRCS office for any proposed improvements to the dam. If one is applying for a grant, then grant process results in public meetings, memorandums of agreement, watershed agreements, and project agreements with the NRCS that require close communication so that all federal, state, and local regulations are followed.

## SUMMARY – STATUS OF PROGRAM

Gwinnett County is in the middle of the CIP to upgrade its NRCS flood control dams to meet the standards established by the Safe Dams Act. To date, two (2) dams met the regulations without a required upgrade, one (1) dam upgrade has been constructed, two (2) dam upgrades are under construction, three (3) dam upgrades are under design, and six (6) are awaiting design to begin. While two (2) of the dams awaiting design to begin are low hazard Category II dams, meaning failure will not result in probable loss of life, Gwinnett County is going to design the required upgrade in anticipation of continued development that results in the dams being reclassified as Category I. As planned,

the program should be completed by 2008 at a total cost of approximately \$18 million, \$9.6 million NRCS and \$8.4 million Gwinnett County.

#### **LITERATURE CITED**

Bramblett, Jimmy and Larry Caldwell, 2004. NRCS Watershed Rehabilitation Program in Georgia. *The Georgia Contractor*, November/December 2004, page 17.