

# Supplemental Final Watershed Plan and Environmental Assessment



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## *Sandy Creek Watershed Structure No. 23*



***Jackson County, Georgia***

***October 2009***

**Supplemental Watershed Plan - Environmental Assessment  
for  
Sandy Creek Watershed Structure No. 23, Georgia**

**Prepared for:**

Georgia Soil and Water Conservation Commission  
Oconee River Soil and Water Conservation District  
Jackson County Board of Commissioners

**Prepared by:**

United States Department of Agriculture,  
Natural Resources Conservation Service

**In Cooperation With:**

Georgia Environmental Protection Division, Safe Dams Program  
Georgia Soil and Water Conservation Commission  
Georgia Wildlife Resources Division  
Golder and Associates, Inc.  
U.S. Army Corps of Engineers  
U.S. Environmental Protection Agency  
U.S. Fish and Wildlife Service

**Proposed Action:**

Rehabilitate and upgrade Sandy Creek Watershed Structure No. 23 to meet Georgia and NRCS dam safety criteria by installing a roller compacted concrete spillway on the top of the current earthen embankment.

**Project Location:**

Jackson County, Georgia

**For More Information:**

Mr. James E. Tillman, Sr.  
State Conservationist  
USDA-Natural Resources Conservation Service  
355 East Hancock Avenue  
Athens, Georgia  
706/546-2272

**Plan Designation:**

FINAL REPORT

**Comment Period:**

Closed

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**Watershed Plan - Environmental Assessment  
for  
Sandy Creek Watershed Structure No. 23, Georgia**

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## **SUPPLEMENTAL WATERSHED AGREEMENT**

**between the  
GEORGIA SOIL AND WATER CONSERVATION COMMISSION  
OCONEE RIVER SOIL AND WATER CONSERVATION DISTRICT, and  
JACKSON COUNTY BOARD OF COMMISSIONERS**

**STATE OF GEORGIA  
(Referred to herein as Sponsors)  
and the**

**NATURAL RESOURCES CONSERVATION SERVICE**

**UNITED STATES DEPARTMENT OF AGRICULTURE**

**(Referred to herein as NRCS)**

**WHEREAS**, a Public Law 83-566 Plan, which included Sandy Creek Watershed was executed between the Sponsors and NRCS became effective in 1968; and

**WHEREAS**, application has heretofore been made to the Secretary of Agriculture by the Sponsor for assistance in preparing a plan for works of improvement for the rehabilitation of Sandy Creek Watershed Structure No. 23, State of Georgia, under the authority of the Public Law 106-472, the Small Watershed Rehabilitation Amendments of 2000, which amends Public Law 83-566, Watershed Protection and Flood Prevention Act (16 U.S.C.1001-1008); and

**WHEREAS**, the responsibility for administration of the Watershed Protection and Flood Prevention Act, as amended, has been assigned by the Secretary of Agriculture to NRCS; and

**WHEREAS**, there has been developed through the cooperative efforts of the Sponsors and NRCS a plan for works of improvement for the Sandy Creek Watershed Structure No. 23, State of Georgia, hereinafter referred to as the watershed plan-Environmental Assessment, which plan is annexed to and made a part of this agreement;

**NOW**, therefore, in view of the foregoing considerations, the Secretary of Agriculture, through NRCS, and the Sponsor hereby agree on this plan and that the works of improvement for this project will be installed, operated, and maintained in accordance with the terms, conditions, and stipulations provided for in this watershed plan and including the following:

1. The Sponsors agree to comply with applicable federal flood-plain management and flood insurance programs before construction starts.
2. The Sponsors will acquire with other than Public Law 83-566 funds, such real property as will be needed in connection with the works of improvement. (Estimated Cost \$0)
3. The Sponsors will be responsible for the operation, maintenance, and any needed replacement of the works of improvement by actually performing the work or arranging for such work, in accordance with an O&M Agreement. An O&M agreement will be entered into before federal funds are obligated and will continue for the project life (50 years). Although the sponsors' responsibility to the Federal Government for O&M ends when the O&M agreement expires upon completion of the evaluated life of measures covered by the agreement, the sponsors acknowledge that continued liabilities and responsibilities associated with works of improvement may exist beyond the evaluated life.
4. The Sponsors will obtain all necessary federal, state, and local permits required by law, ordinance, or regulation for installation of planned works of improvement. The costs of such permitting is not eligible as part of the sponsors cost-share requirements.
5. The Sponsors will be responsible for the costs of water, mineral, and other resource rights and will acquire or provide assurance that landowners or resource users have acquired such rights pursuant to state law as may be needed in the installation and operation of the works of

improvement. The costs associated with the subject rights are not eligible as a part of the sponsors' cost-share requirement.

6. The Sponsors hereby agree that they will comply with all of the policies and procedures of the Uniform Relocation Assistance and Real Property Acquisition Policies Act (42 U.S.C. 4601 et. seq. as implemented by 7 C. F. R. Part 21) when acquiring real property interests for this federally assisted project. If the sponsors are legally unable to comply with the real property acquisition requirements of the act, it agrees that, before any federal assistance is furnished, it will provide a statement to that effect, supported by an opinion of the chief legal officer of the state containing a full discussion of the facts and law involved. This statement may be accepted as constituting compliance. In any event, the sponsor agrees that it will reimburse owners for necessary expenses as specified in 7 C.F.R. 21.1006 (c) and 21.1007.
7. NRCS will assist the Sponsors with the installation of planned works of improvement. The percentages of total rehabilitation project costs to be paid by the Sponsors and NRCS are as follows:

<u>Improvement</u>	<u>Sponsors</u> 35%	<u>NRCS</u> 65%	<u>Total of Cost Sharable Items</u>
Rehabilitation of Sandy Creek No. 23	\$957,257	\$1,777,763	\$2,735,020

Total project costs include construction, land rights, administrative and legal expenses, architectural and engineering fees, project inspection fees, and engineering contingencies. Not included is technical assistance provided by NRCS, or the costs of permitting and ordinances.

8. The Sponsors will be responsible for providing leadership for the development of an emergency action plan (EAP) prior to initiating construction activities at the project site. The EAP shall meet the minimum content specified in Part 500.52 of the NRCS National Operation and Maintenance Manual, and meet applicable State agency dam safety requirements. NRCS will provide technical assistance in preparation and updating of the EAP. The NRCS State Conservationist will determine that an EAP is prepared prior to the execution of fund obligating documents for construction of the structure. The EAP shall be reviewed and updated by the sponsors.
9. The costs shown in this agreement and plan are preliminary estimates. Final costs to be borne by the parties hereto, will be based on the actual costs incurred in the installation of works of improvement and the cost share percentages stated in this agreement.
10. No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this plan, or to any benefit that may arise there from; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.
11. The term of this agreement is for the installation period and evaluated life of the project (50 years) and does not commit NRCS to assistance of any kind beyond the end of the evaluated life. No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this plan, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.
12. This agreement is not a fund-obligating document. Financial and other assistance to be furnished by NRCS in carrying out the watershed plan is contingent upon the fulfillment of applicable laws and regulations and the availability of appropriations for this purpose.
13. A separate agreement will be entered into between NRCS and the Sponsors before either party initiates work involving funds of the other party. Such agreements will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.

14. This plan may be amended or revised only by mutual agreement of the parties hereto, except that NRCS may deauthorize or terminate funding at any time it determines that the Sponsors have failed to comply with the conditions of this agreement. In this case, NRCS shall promptly notify the Sponsors in writing of the determination and the reasons for the deauthorization of project funding, together with the effective date. Payments made to the Sponsors or recoveries by NRCS shall be in accord with the legal rights and liabilities of the parties when project funding has been deauthorized. An amendment to incorporate changes affecting a specific measure may be made by mutual agreement between NRCS and the Sponsors having specific responsibilities for the measures involved.
15. Activities conducted under this agreements will be in compliance with nondiscrimination provisions as contained in Titles VI and VII of the Civil Rights Act of 1964, as amended, the Civil Rights Restoration Act of 1987(Public law 100-259) and other nondiscrimination statues, namely, section 504 of the Rehabilitation Act of 1973, Title IX of the Education Amendments of 1972, The Age Discrimination Act of 1975,and in accordance with regulations of the Secretary of Agriculture(7 CFR. 15, Subparts A&B) which provide that no person in the United States shall, on the grounds of race, color, national origin, religion, sex, age, marital status or handicap, be excluded from participation in, be denied the benefits of, or otherwise be subjected to discrimination under any program or activity receiving Federal financial assistance from the Department of Agriculture or any agency thereof.
16. Certification Regarding Drug-Free Workplace Requirements (7 CFR 3017, Subpart F).

By signing this watershed agreement, the Sponsors are providing the certification set out below. If it is later determined that the Sponsors knowingly rendered a false certification, or otherwise violated the requirements of the Drug-Free Workplace Act, the NRCS, in addition to any other remedies available to the Federal Government, may take action authorized under the Drug-Free Workplace Act.

Controlled substance means a controlled substance in Schedules I through V of the Controlled Substances Act (21 U.S.C. 812) and as further defined by regulation (21 CFR 1308.11 through 308.15);

Conviction means a finding of guilt (including a plea of nolo contendere) or imposition of sentence, or both, by any judicial body charged with the responsibility to determine violations of the Federal or State criminal drug statutes;

Criminal drug statute means a Federal or non-Federal criminal statute involving the manufacturing, distribution, dispensing, use, or possession of any controlled substance;

Employee means the employee of a grantee directly engaged in the performance of work under a grant, including: (i) all direct charge employees; (ii) all indirect charge employees unless their impact or involvement is insignificant to the performance of the grant; and, (iii) temporary personnel and consultants who are directly engaged in the performance of work under the grant and who are on the grantee's payroll. This definition does not include workers not on the payroll of the grantee (e.g., volunteers, even if used to meet a matching requirement; consultants or independent contractors not on the grantees' payroll; or employees of subrecipients or subcontractors in covered workplaces).

**Certification:**

A. The Sponsors certify they will continue to provide a drug-free workplace by:

(1) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violation of such prohibition;

(2) Establishing an ongoing drug-free awareness program to inform employees about --

(a) The danger of drug abuse in the workplace;

The grantee's policy of maintaining a drug-free workplace;

Any available drug counseling, rehabilitation, and employee assistance programs; and

The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace;

(3) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (1);

(4) Notifying the employee in the statement required by paragraph (1) that, as a condition of employment under the grant, the employee will --

(a) Abide by the terms of the statement; and

Notify the employer in writing of his or her conviction --- for a violation of a criminal drug statute occurring in the workplace no later than five calendar days after such conviction;

(5) Notifying the NRCS in writing, within ten calendar days after receiving notice under paragraph (4) (b) from an employee or otherwise receiving actual notice of such conviction. Employers of convicted employees must provide notice, including position title, to every grant officer or other designee on whose grant activity the convicted employee was working, unless the Federal agency has designated a central point for the receipt of such notices. Notice shall include the identification number(s) of each affected grant;

(6) Taking one of the following actions, within 30 calendar days of receiving notice under paragraph (4) (b), with respect to any employee who is so convicted--

Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, as amended; or

Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency; and

(7) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (1), (2), (3), (4), (5), and (6).

B. The Sponsors may provide a list of the site(s) for the performance of work done in connection with a specific project or other agreement.

C. Agencies shall keep the original of all disclosure reports in the official files of the agency.

17. Certification Regarding Lobbying (7 CFR 3018) (applicable if this agreement exceeds \$100,000).

(1) The Sponsors certify to the best of its knowledge and belief, that:

No Federal appropriated funds have been paid or will be paid, by or on behalf of the Sponsors, to any person for influencing or attempting to influence an officer or employee of an agency, Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form - LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

The Sponsors shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

(2) This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file

the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

18. Certification Regarding Debarment, Suspension, and Other Responsibility Matters - Primary Covered Transactions (7 CFR 3017).

The Sponsors certify to the best of their knowledge and belief, that they and their principals:

Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency.

Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and

Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated for cause or default.

(2) Where the primary Sponsor is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this agreement.

19. Clean Air and Water Certification

A. Applicable if this agreement exceeds \$100,000, or a facility to be used has been subject of a conviction under the Clean Air Act (42 U.S.C. 7413(c)) or the Federal Water Pollution Control Act (33 U.S.C. 1319(c)) and is listed by EPA, or is not otherwise exempt.

B. The project sponsoring organization(s) signatory to this agreement certifies as follows:

(1) Any facility to be utilized in the performance of this proposed agreement is (  ), is not (  X  ) listed on the Environmental Protection Agency List of Violating Facilities.

(2) To promptly notify the NRCS-State Administrative Officer prior to the signing of this agreement by NRCS, of the receipt of any communication from the Director, Office of Federal Activities, U.S. Environmental Protection Agency, indicating that any facility which is proposed for use under this agreement is under consideration to be listed on the Environmental Protection Agency List of Violating Facilities.

(3) To include substantially this certification, including this subparagraph, in every nonexempt sub-agreement.

C. The project sponsoring organization(s) signatory to this agreement agrees as follows:

(1) To comply with all the requirements of section 114 of the Clean Air Act as amended (42 U.S.C. 7414) and section 308 of the Federal Water Pollution Control Act (33 U.S.C. 1318), respectively, relating to inspection, monitoring, entry, reports, and information, as well as other requirements specified in section 114 and section 308 of the Air Act and the Water Act, issued there under before the signing of this agreement by NRCS.

(2) That no portion of the work required by this agreement will be performed in facilities listed on the EPA List of Violating Facilities on the date when this agreement was signed by NRCS unless and until the EPA eliminates the name of such facility or facilities from such listing.

(3) To use their best efforts to comply with clean air standards and clean water standards at the facilities in which the agreement is being performed.

(4) To insert the substance of the provisions of this clause in any nonexempt sub-agreement.

D. The terms used in this clause have the following meanings:

(1) The term "Air Act" means the Clean Air Act, as amended (42 U.S.C. 7401 et seq.).

(2) The term "Water Act" means Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq.).

(3) The term "clean air standards" means any enforceable rules, regulations, guidelines, standards, limitations, orders, controls, prohibitions, or other requirements which are contained in, issued under, or

otherwise adopted pursuant to the Air Act or Executive Order 11738, an applicable implementation plan as described in section 110 of the Air Act (42 U.S.C. 7414) or an approved implementation procedure under section 112 of the Air Act (42 U.S.C. 7412).

(4) The term "clean water standards" means any enforceable limitation, control, condition, prohibition, standards, or other requirement which is promulgated pursuant to the Water Act or contained in a permit issued to a discharger by the Environmental Protection Agency or by a State under an approved program, as authorized by section 402 of the Water Act (33 U.S.C. 1342), or by a local government to assure compliance with pretreatment regulations as required by section 307 of the Water Act (33 U.S.C. 1317).

(5) The term "facility" means any building, plan, installation, structure, mine, vessel, or other floating craft, location or site of operations, owned, leased, or supervised by a sponsor, to be utilized in the performance of an agreement or sub-agreement. Where a location or site of operations contains or includes more than one building, plan, installation, or structure, the entire location shall be deemed to be a facility except where the Director, Office of Federal Activities, Environmental Protection Agency, determines that independent facilities are collocated in one geographical area.

## 20. Assurances and Compliance

As a condition the grant or cooperative agreement, the recipient assures and certifies that it is in compliance with and will comply in the course of the agreement with all applicable laws, regulations, Executive Orders and other generally applicable requirements, including those set out below which are hereby incorporated in this agreement by reference, and such other statutory provisions as a specifically set forth herein.

State and Local Governments: OMB Circular Nos. A-87, A-102, A-129, and A-133; and 7CFR Parts 3015, 3016, 3017, 3018, and 3052.

Educational Institutions: OMB Circular Nos. A-21, A-110, and A-129; and 7CFR Parts 3015, 3016, 3017, 3018, and 3019.

Indian Tribal Governments: OMB Circular Nos. A-87, A-102, and A-129; and 7CFR Parts 3015, 3016, 3017, 3018, and 3052.

Non-Profit Organizations, Hospitals, Institutions of Higher Learning: OMB Circular Nos. A-110, A-122, A-129, and A-133; and 7CFR Parts 3015, 3016, 3017, 3018, 3019, and 3052.

## 21. Examination of Records

Give NRCS or the Comptroller General, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to this agreement. Retain all records related to this agreement for a period of three years after completion of the terms of this agreement in accordance with the applicable OMB Circular.

**GEORGIA SOIL AND WATER CONSERVATION COMMISSION**

The signing of this plan was authorized by a resolution of the governing body of the Georgia Soil and Water Conservation Commission adopted at a meeting held on \_\_\_\_\_ [Date].

By \_\_\_\_\_

Title Executive Director

Title: Secretary

Date \_\_\_\_\_

Date \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**OCONEE RIVER SOIL AND WATER CONSERVATION DISTRICT, GA.**

The signing of this plan was authorized by a resolution of the governing body of the Oconee River Soil and Water Conservation District adopted at a meeting held on \_\_\_\_\_ [Date].

By \_\_\_\_\_

Title District Chairman

Title: Secretary

Date \_\_\_\_\_

Date \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**JACKSON COUNTY, BOARD OF COMMISSIONERS**

The signing of this plan was authorized by a resolution of the governing body of the Jackson County Board of Commissioners adopted at a meeting held on \_\_\_\_\_ [Date].

By \_\_\_\_\_

Title Chairman

Title: County Clerk

Date \_\_\_\_\_

Date \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Address

Address

**NATURAL RESOURCES CONSERVATION SERVICE  
UNITED STATES DEPARTMENT OF AGRICULTURE**

Approved by:

\_\_\_\_\_  
James E. Tillman, Sr.  
State Conservationist

Date: \_\_\_\_\_

**Supplemental Watershed Plan - Environmental Assessment  
for  
Sandy Creek Watershed Structure No. 23, Georgia**

**EXECUTIVE SUMMARY OF WATERSHED PLAN**

**Project Name:** Sandy Creek Watershed Structure No. 23

**County:** Jackson                      **State:** Georgia

**Sponsors:** Georgia Soil and Water Conservation Commission  
Jackson County Board of Commissioners  
Oconee River Soil and Water Conservation District

**Description of Selected Plan:**

The Selected Plan consists of rehabilitating an aging floodwater retarding structure to meet current dam design and safety criteria.

**Resource Information:**

Sandy Creek Watershed Structure No. 23 Drainage Area – Land Cover

<u>Land Cover</u>	<u>Acres</u>
Forest/Woods	1370
Pasture/Grassland	943
Meadow/Grass	188
Paved/Commercial	93
Paved/Ditches	16
Streams/Lakes	<u>38</u>
<b>TOTAL</b>	<b>2648</b>

Source: Northeast Georgia Regional Development Center, March 2009.

Land Ownership - 88% private, 12 % public	Wetlands - 82 Acres
Number of Farms - 3	Flood Plains -241 Acres
Average Farm Size - 33 Acres	Highly Erodible Cropland – 487Acres
Prime and Important Farm Land – 628 Acres	No. Minorities Producers - 0
	No. Limited Resource Operators - 0

**Project Beneficiaries:**

The watershed is oriented primarily to residential development and associated service industries, along with major public infrastructure investments [roads, sewer, etc.]. The 2007 Census reported that Jackson County, Georgia had a population of 61,620 up from 41,589 in 2000. As such, private homeowners, retail establishments, manufacturer’s, regional commuters, local government’s, and the state government are the primary beneficiaries of this project.

In March 2009, unemployment in Jackson County was 9.9 percent. Median household income was \$49,820 while per capita income was \$24,074.

**Threatened and Endangered Species:**

The US Fish and Wildlife Service and the Georgia Wildlife Resources Division expressed no concerns associated with the proposed project with regards to the Endangered Species Act. Recommendations for protecting lake fisheries during construction activities have been given by these agencies for similar projects in Jackson County. The project will have no effect on these species.

**Cultural Resources:**

An inventory of the watershed on the SHPO website was conducted with no culturally important or archaeological sites noted. A description of the planned action was forwarded to the State Historic Preservation Officer on May 3, 2009 with no comment received within the 30-day period.

**Problem Identification:**

Sandy Creek Watershed Structure No. 23 does not meet current dam design and safety requirements. The dam was originally constructed in 1963 as a Class (a) [low hazard] structure for the purpose of protecting downstream agricultural lands from flooding. In response to the population expansion into the watershed, and downstream of the watershed structure, the Georgia Environmental Protection Division, Safe Dams Program, classified Sandy Creek Watershed Structure No. 23 as a “high hazard” dam. The high hazard classification is based on the potential loss of life due to 1 residence and 4 roads existing in the downstream dam break flood zone resulting from a potential dam failure. The corresponding NRCS hazard classification now identifies this dam as a Class (c) [high hazard] structure.

**Alternative Plans Considered:**

Six alternative plans of action to meet the sponsor’s objectives were considered:

1. No Action – Removal of the hazard by breaching the earthen embankment pursuant to a mandate from the Georgia Environmental Protection Division.
2. Decommission – Removal of the hazard by breaching the earthen embankment to NRCS standards.
3. Non-Structural – Removal of the hazard by purchasing downstream structure and green space.
4. Structural – Labyrinth Weir Spillway – Construct a labyrinth weir spillway with 108 ft width on the existing embankment of the dam and raise the dam crest 3.22 ft to an elevation 779.72 ft MSL.
5. Structural – Roller Compacted Concrete – Installation of an ogee weir 350 feet in width with a RCC chute spillway over the embankment at an elevation of 772.5 ft MSL and raise the top of dam 2.5 feet to an elevation of 779.0 ft MSL.
6. Structural – Labyrinth Weir Spillway – Construct a labyrinth weir spillway with 130 ft or 157 ft width on the existing embankment of the dam and alter the existing principal spillway riser.

**Project Purpose:**

This project meets all applicable safety and performance standards, and it extends the service life of the watershed structure. This project also complies with the purpose of Flood Prevention as outlined in the NRCS Watershed Manual, Part 502-C, and part 508. The objective of this project is to bring Sandy Creek Watershed Structure No. 23 into compliance with applicable design and performance standards

**Principal Project Measures:**

Rehabilitate and upgrade Sandy Creek No. 23 by installing a Roller Compacted Concrete Spillway.

<b>Project Costs (Dollars):</b>	<u>PL-566 Funds</u>	<u>Other Funds</u>	<u>Total</u>
Structural Measures	2,207,600	957,200	3,164,800

**Monetary Benefits (Average Annual):**

Agricultural Related: \$0  
 Non-Agricultural Related: \$ 176,084  
 Total Monetary Benefits: \$ 176,084

Project Benefits: (Price Base 2009)

**Non-Monetary Benefits:**

- Meet dam design and safety criteria
- Reduce the potential for loss of life
- Protect wetlands

**Resource**

Land Use Changes

Flood Plains

Fisheries

Wildlife Habitat

Wetlands

Cultural Resources (No. & Type)

Prime Farmland (Ac)

Compensatory Mitigation:

**Impact**

**No Impact**

**No Impact – The flood plain will remain unchanged**

**Fish habitats will be maintained and protected**

**Woody lowland habitats will be maintained and protected in the upper reaches of the lake.**

**The make-up and composition of wetlands will be maintained and protected.**

**No Impact**

**No Impact**

**None**

## INTRODUCTION

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### NEED AND PURPOSE:

The need for this watershed plan arises from the fact that Sandy Creek Watershed Structure No. 23 does not currently meet dam design and safety criteria. As a result – lives, structures [homes and businesses], and infrastructures [roads and sewer] are at risk. This watershed plan documents the planning process by which the USDA-Natural Resources Conservation Service [NRCS] provided technical assistance to local project sponsors, technical advisors, and the public in addressing resource issues and concerns within the Sandy Creek Watershed, Jackson County. The primary objective for Sandy Creek No. 23 is *to provide continued flood protection and reduce the risk of loss of human life* and to meet applicable NRCS and State of Georgia safety and performance standards, and to extend the service life of this watershed structure.

## PROJECT SETTING

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### ORIGINAL PROJECT:

The original project was based on a plan for six Public Law 83-566 flood water retarding structures and 11.95 miles of channel improvement in Jackson County Georgia. Completed in 1963, planned measures included the six structures, channel improvements and numerous land treatment practices. Of this total, all six PL-566-flood water retarding structures were built, including Sandy Creek Watershed Structure No. 23, which was completed in 1963.

### PHYSICAL FEATURES

#### 1. Project Location:

The Sandy Creek No. 23 project is located in Jackson County, Georgia, in north central Georgia in the Southern Piedmont Land Resource Area (MLRA 304) in the North Oconee River Basin (see Figure 1). The Project area is within the sub-watershed 030701010502, which includes the headwaters of Sandy Creek. The project site is situated in the northern area of the Sandy Creek drainage basin. The original Sandy Creek Watershed project area is 10,377 acres. Of this total, 2670 acres are located upstream of the Sandy Creek Structure No. 23. Including downstream impacts, the total project area under this supplemental watershed plan is 3,666 acres.

#### 2. Topography

The Sandy Creek No. 23 Watershed drainage area is approximately 3.1 miles in length and 1.9 miles in width with elevations ranging from 778.7 feet mean sea level (MSL) at the normal pool elevation to over 965 feet MSL in the headwaters.

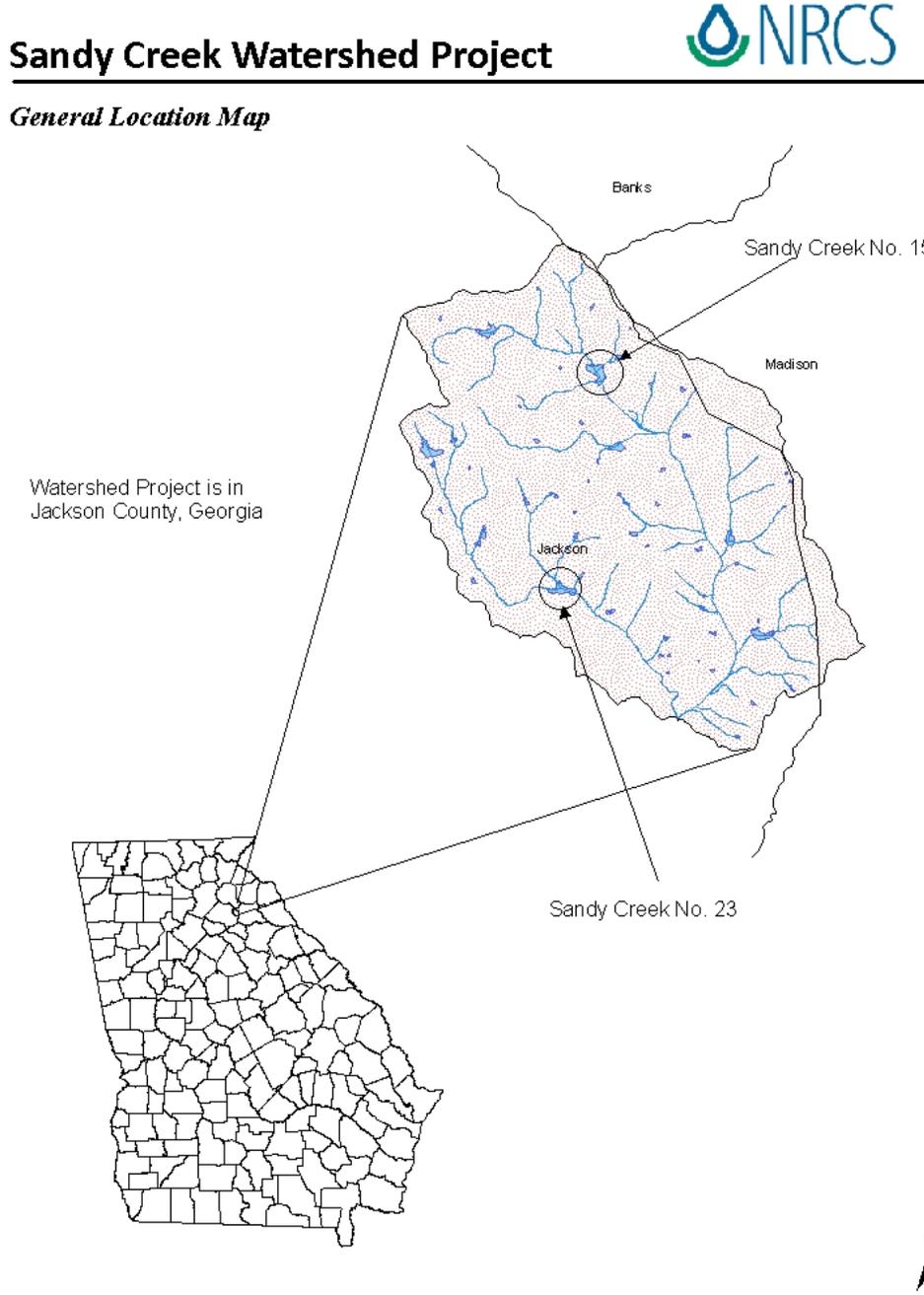
#### 3. Climate

The climate of the watershed is humid and mild with long hot summers and cool short winters. Summer temperatures normally exceed 90 degrees F. and winter temperatures are rarely lower than 20 degrees F. The average annual temperature is 61 degrees F. Precipitation is fairly heavy throughout the year averaging 53.7 inches. It is normal to have more than 0.10 inch of rain per day on 77 days of the year, 0.5 inches of rain per day on 35 days of the year, and 1.0 inch or more on 15 days of the year.

#### 4. Soils

During this planning process, soils were inventoried for their runoff potential according to the NRCS hydrologic soil group classification system. An estimated 2401.2 acres (92.0 %) of the watershed soils are classified as hydrologic group B, silts and loams with moderate infiltration rates and fine to coarse textures. Another 208.8 acres (8.0 %) are classified as hydrologic group C soil with slow infiltration. Hydrologic features such as lakes, streams, ponds, etc. cover the remaining 38 acres.

Figure 1. Location Map – Sandy Creek Watershed.



## 5. Geology

The watershed lies in the Piedmont Physiographic Province of northern Georgia. The Piedmont Province consists of a sequence of folded and faulted igneous and metamorphic rocks of Precambrian and Paleozoic Age. Piedmont rock types include schist, felsic and mafic gneiss, granite, amphibolite, quartzite, and ultramafic complexes. The underlying rocks in the vicinity of Sandy Creek No. 23 were found to be highly contorted gneisses and schists, and weathered to varying depths. Within the Piedmont, in-place weathering of igneous and metamorphic rocks generally produces a layer of saprolite over the bedrock. Saprolite is essentially highly weathered rock that retains the original structure of the parent rock. Saprolite may exist near the surface and/or below a layer of soil.

## 6. Threatened and Endangered Species

The US Fish and Wildlife Service and the Georgia Wildlife Resources Division has indicated that T&E species in Jackson County, Georgia are not present due to massive development that has taken place in this community over the past 25 years. They further indicated no concerns associated with Endangered Species Act, and provided recommendations for protecting lake fisheries during construction activities.

## 7. Cultural Resources, Natural and Scenic Areas, and Visual Resources

A description of the planned action was forwarded to the State Historic Preservation Officer on May 3, 2009 with no comment received within the 30-day review period.

Georgia has no World Heritage sites and none of the sites that are listed in the National Registry of Natural Landmarks are in Georgia. Forty-six sites in Georgia are listed on the National Register of Historic Landmarks. None are in Jackson County and, therefore, none will be affected by proposed activities associated with this project.

The National Register of Historic Places lists 9 sites in Jackson County. These Include: Commerce Commercial Historic District Roughly bounded by Line, State, Cherry, Sycamore and Broad Sts. Commerce; Hardman, Governor L. G., 208 Elm St, Commerce; Hillcrest-Allen Clinic and Hospital, GA 53 & Peachtree Rd, Hoschton; Holder Plantation, Jct. of Possum Creek Rd. and US 129, Jefferson; Hoschton Depot, Hoschton; Jackson County Courthouse, Jefferson; Jefferson Historic District, Jefferson; Maysville Historic District, Along E. Main, W. Main and Homer Sts., Maysville; Oak Avenue Historic District, S of jct. of Oak Ave. and the Southern RR, Jefferson.

## **SOCIAL AND ECONOMIC CONDITIONS**

### 1. Recreation

Sandy Creek No. 23 provides local recreation to homeowners around the lake. Lake-based recreation consists of fishing, swimming, paddling, and boating. Approximately 8,000 water-based recreational user-days are directly related to Sandy Creek No. 23 annually.

### 2. Real Estate

There are approximately 4 houses within 1,000 feet of the pool, 1 houses and 4 roads within the 100-year floodplain below the dam. Property values around the lake range from \$350,000 to \$500,000 with an average of \$425,000. Lake front properties experience values that are 15 to 25% higher than comparable non-lakefront property. Property values below Sandy Creek No. 23 range between \$100,000 and \$160,000 with an average value of \$140,000.

### 3. Social and Economic Data

Jackson County is included in the Atlanta Georgia Metropolitan Statistical Area. Total population for the county in 2007 was approximately 61,620. Of this total, 30 percent live in urbanized areas. The population is 89 percent white, 7 percent black and 4 percent Hispanic/Other ethnic groups.

In March 2009, unemployment in Jackson County was 9.9 percent. Median Household Income in 2007 was \$49,820 while Per Capita Income was \$24,074.

### 4. Education

Approximately 12 percent of the residents in the county have a bachelors degree or higher.

## **DESCRIPTION OF EXISTING DAM**

Sandy Creek Watershed Dam No. 23 is located in Jackson County near the City of Nicholson, Georgia. The dam and the 20.7 ac reservoir retain runoff from the headwaters of Hardeman Creek, which is a perennial tributary to Sandy Creek. The dam is approximately 2.5 miles upstream of the confluence with the Sandy Creek north of Athens, Georgia. The Sandy Creek Watershed is part of the Oconee River Basin. The watershed for Sandy Creek Watershed Dam No. 23 extends north and northwest from the dam and is approximately bounded by the intersection of US Hwy 441 and GA-98 on the north, US Hwy 441 on the west, GA Hwy 334 on the east, Berea Road on the south, and just upstream of Berea Road to the southeast. There are no major dams located upstream of Sandy Creek No. 23.

**HAZARD CLASSIFICATION:**

Sandy Creek No. 23 was originally constructed as a low hazard class (a) dam. Since that time, Jackson County’s population has increased from 41,589 in 2000 to 61,620 in 2007. There is now 1 house and 5 roads in the dam breach zone prompting the Georgia Environmental Protection Division, Safe Dams Program [EPD] to identify this structure as a high hazard dam. Current NRCS criteria would require a class (c) [high hazard] designation. These classifications are based upon the risk to life and property downstream in the event of a dam failure.

**STRUCTURAL DATA:**

**Table A. Existing Structural Data for Sandy Creek Watershed Structure No. 23.**

Dam Name	Sandy Creek No. 23
Stream	Hardeman Creek
Year Completed	1963
Cost	\$30,000
Purpose	Flood Prevention
Drainage Area	2,648 Acres
Dam Height	34 Feet
Dam Type	Earthen
Dam Volume	35,413 yds. <sup>3</sup>
Dam Crest Length	480 Feet
Storage Capacity	
Sediment	89 Acre-Feet
Flood	810 Acre-Feet
Surcharge	345 Acre-Feet
Total	1,244 Acre-Feet
Principal Spillway	
Type	Reinforced Concrete Riser
Riser Height	23 Feet
Stages	2
Conduit Size	2.5 Feet
Conduit Length	216 Feet
Capacity	115 ft <sup>3</sup> /s
Energy Dissipator	Lined Plunge Pool
Auxiliary Spillway	
Type	Vegetated
Width	50 Feet
Capacity	1030 ft <sup>3</sup> /s
Normal Pool Elevation	755.9 ft-mean sea level
Flood Pool Elevation	772.5 ft-mean sea level
Top of Dam Elevation	776.5 ft-mean sea level

**STATUS OF OPERATION AND MAINTENANCE:**

The current maintenance agreement between the Georgia Soil and Water Commission, the Oconee River Soil and Water Conservation District and the Jackson County Board of Commissioners has been in effect since October 16, 1996. The Inspection Operation and Maintenance reports for years 2001 through 2008 indicate that there are ongoing problems with debris accumulating in the trash gate, vines growing on the principal spillway riser, erosion around the principal spillway outlet pipe, rusting riser gate hoist, unlubricated gate hoist, animal guards missing from rusted toe drains, and trees and brush growing on the dam and at waterline. Operation and maintenance deficiencies are not issues to be addressed with funding for rehabilitation. The sponsors will be working in cooperation with NRCS to address operation and maintenance deficiencies independent of rehabilitation efforts.

**Figure 2 – SANDY CREEK NO. 23 Plunge Pool with Principal Spillway Pipe in Foreground.**



**Figure 3 – SANDY CREEK NO. 23 Lake View with Riser in Foreground.**



## **WATERSHED PROBLEMS AND OPPORTUNITIES**

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### **WATERSHED PROBLEMS:**

The Georgia Environmental Protection Division, Safe Dams Program [EPD] has classified Sandy Creek No. 23 as a high hazard dam. This classification is based on the fact that 1 inhabited structure and 4 roads are located downstream of the dam in the “breach zone”, and Sandy Creek No. 23 does not currently meet applicable safety and performance criteria associated with a high hazard dam. A breach zone is that area below an impoundment of water that is likely to be inundated upon the sudden release of stored water should the impoundment breach. Golder Associates, Inc. identified the breach zone for Sandy Creek Watershed Structure No. 23.

The Sponsors have identified flood protection in the floodplain downstream as a primary concern. Jackson County participates in the National Flood Insurance Program and realizes the value Sandy Creek No. 23 provides in flood protection benefits by protecting houses that would otherwise be in the 100-year floodplain. As such, they have expressed concerns about returning to pre-project flood exposure. Specifically, they have intimated that removing Sandy Creek No. 23 would have negative impacts associated with flood frequency and intensity downstream, including decreased property values, increased flood insurance premiums, disruptions to transportation and utilities.

The potential for removing Sandy Creek No. 23 has also sparked a number of concerns among local residents. Specifically, they have identified the potential for depreciating property values as a primary concern. They have also indicated that removing Sandy Creek No. 23 will result in a loss of fish and wildlife habitats and recreational opportunities. Furthermore, water quality and sediment accumulation, under any alternative is an issue of concern for local residents as well.

**WATERSHED OPPORTUNITIES:**

The following is a general list of opportunities that will be realized through the implementation of this watershed plan:

- Compliance with Dam Design and Safety Criteria
- Protect Public Safety
- Prevent Increased Flooding in the Floodplain
- Extending the Service Life of Sandy Creek No. 23
- Protect Real Estate Values
- Protect Fish and Wildlife Habitats
- Protect Recreation Opportunities
- Improved Water Quality [Sediment Accumulation]

Quantification of these opportunities is provided in other sections.

**SCOPE OF ENVIRONMENTAL ASSESSMENT**

A scoping process was used to identify issues of economic, environmental, cultural, and social concerns in the watershed. Watershed concerns of sponsors, a technical advisory group, and local citizens were expressed at planning and public meetings. Factors that would affect soil, water, air, plant, and animal resources were identified by multidisciplinary teams composed of engineers, biologists, economists, resource conservationists, water quality specialists, and others. Concerns and their degree of significance to the decision making process were identified. The following table shows the degree of concern and degree of importance in decision making.

**Table B. Magnitude of Identified Resource Concerns**

<b>Economic, Environmental, Cultural, and Social Concerns</b>	<b>Degree of Concern 1/</b>	<b>Degree of Importance 1/</b>	<b>Comment</b>
Water Quality	High	High	Primary concern of Local Residents
Property Values	High	High	Primary concern of Local Residents
Endangered & Threatened Species	High	High	Primary concern of Local Residents
Public Safety	High	High	Primary concern of Sponsor/EPD
Recreational Opportunities	High	High	Primary concern of Local Residents
Water Supply	Medium	Medium	
Fish & Wildlife Habitats	Medium	Medium	
Sedimentation	Medium	Medium	
Flooding in Floodplain	Medium	Medium	
Forest Land	Medium	Medium	
Historic and Cultural Properties	Medium	High	
Transportation	Low	Low	
Wetlands	Low	Low	
Air Quality	Low	Low	
Prime Farmland	Low	Low	

1/ High - must be considered in the analysis of alternatives; medium - may be affected by some alternative solutions; low - consider, but not very significant.

## **FORMULATION OF ALTERNATIVES**

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The Sandy Creek No. 23 Watershed project is formulated is to provide continued flood protection and reduce the risk of loss of human life. The consensus of federal, state, and local planners in the planning process is that installation of planned measures will satisfy this objective. Preliminary investigations revealed three additional objectives of prime important to the sponsor. Collectively, these objectives are:

1. To bring Sandy Creek No. 23 into compliance with current dam safety, design and performance standards,
2. To prevent catastrophic breach of Sandy Creek No. 23, and
3. To address major [high] concerns of local residents within the scope of the Watershed Rehabilitation Program and this planning process.

### **FORMULATION PROCESS:**

Formulation of alternative plans for Sandy Creek No. 23 followed procedures outlined in the NRCS-National Watershed Manual, Part 508. Other guidance incorporated into the formulation process included the NRCS-National Planning Procedures Handbook, Economic and Environmental Principles and Guidelines for Water and Related Land Resource Problems, and other NRCS watershed planning policy.

The formulation process began with formal discussions between the Sponsor, Georgia Environmental Protection Division [EPD], NRCS, and the Georgia Soil and Water Conservation Commission [GSWCC]. EPD conveyed state law and policy associated with high hazard dams. NRCS explained agency policy associated with the Aging Dam Program and related alternative plans of action. As a result, five alternative plans of action were developed based on their ability to address the initial objective of bringing Sandy Creek No. 23 into compliance with current dam safety criteria:

- No Action Alternative
- Decommission Dam
- Non-Structural – Purchase downstream structure and green space.
- Structural – Labyrinth Weir Spillway and Raise Top of Dam
- Structural – Structural – Roller Compacted Concrete Chute Spillway with Ogee Weir Crest
- Structural – Labyrinth Weir Spillway and Alteration of Principal Spillway Riser

Alternative plans of action were presented to the public at a May 28, 2009 public meeting. Public meeting participants identified no additional alternative plans of action to be considered during the planning process.

### **BREACH ANALYSIS:**

Sandy Creek Watershed Structure No. 23 is located in Jackson County, near Nicholson and Commerce, Georgia and has a drainage area of 2,648 acres. The site is located on the headwaters of Hardeman Creek approximately 2.27 miles upstream from Sandy Creek. Water exiting the dam flows approximately 9.2 miles downstream to Sandy Creek Park Lake where it intersects the Clarke County line. Golder Associates Inc. of Atlanta, Georgia, performed the breach analysis assuming a sunny day breach with water at top of dam and assuming the two existing earthen auxiliary spillways were blocked. The analysis was conducted using the Dam-Break Flood Forecasting (DAMBRK) model developed by the National Weather Service (NWS). DAMBRK is based on implicit finite difference solutions of the one dimensional Saint-Venant equations of unsteady flow. The breach flood wave crest is completely within the 100-year floodplain approximately 8.5 miles downstream from the dam [Table C]. The area affected by the flood wave is illustrated in the Breach Inundation Map included in Appendix B.

**Table C – Results of a Dam Breach Routing for Sandy Creek No. 23.**

Cross Section Number	Cross Section Location (miles)	Maximum Water Surface Elevation (ft MSL)	Maximum Flow (cfs)
1	0.00	776.51	19,892
3	0.43	745.87	19,892
6	1.27	733.49	14,793
9	2.33	718.15	11,786
11	3.23	704.85	9,082
13	3.87	696.72	6,805
15	4.75	686.40	5,558
17	5.26	681.82	5,398
19	6.53	671.12	4,641
20	7.05	663.87	4,540
22	7.48	659.55	4,417
24	8.45	654.42	4,075
26	9.71	648.16	3,643

The breach could potentially damage 1 inhabited structure and overtop 4 roads. Based on the results of this analysis, the Georgia State Conservation Engineer has concurred Sandy Creek Watershed Structure No. 23 should be classified as a high hazard [class (c)] structure. Additionally, the Georgia Safe Dams Program, using their criteria, has concluded this structure is a Category I [high hazard] dam pursuant to Georgia’s Safe Dams rules and regulations.

**EVALUATION OF POTENTIAL FAILURE MODES:**

*Sedimentation* – Most FWRS are designed to store sediment. When the sediment pool has filled to the elevation of the principal spillway inlet, the pool no longer has permanent water storage, but still has some level of flood control. As the detention pool loses storage due to sediment deposition, the auxiliary spillway operates, or has flowage more often and is, therefore, subject to erosion. A potential mode of failure exists as the auxiliary spillway continues to degrade and depth of flow increases. The dam will ultimately breach.

There is no record of the auxiliary spillway on Sandy Creek No. 23 ever carrying flood flows. The structure was designed with a 100-year sediment storage life, and a sediment storage capacity of 89 acre-feet. As a part of the planning process, a reservoir sediment survey was conducted in May 2009. The survey revealed that some 24 acre-feet of sediment had been deposited in the reservoir since its construction in 1963. This equates to a sediment deposition rate of .67 acre-feet per year, which is lower than originally planned.

Estimating future sediment accumulation in Sandy Creek No. 23 is based on assumptions regarding future land use in the drainage area. Jackson County estimates that only 94 percent of the watershed [2501 acres] remains suitable for development. Given current development patterns for residential and commercial properties within the area, the watershed should 60 percent develop within the next 50 years. Accounting for these dynamics in land use over the next 50 years, an additional 33 acre-feet of sediment can be expected to accumulate in Sandy Creek No. 23 by 2059. Based on this re-evaluation and reallocated land-use, the sediment storage life of Sandy Creek No. 23 is well in excess of 50 years. Therefore, sedimentation presents no potential for dam failure during the evaluation period of this project.

*Hydrologic Capacity* – Hydrologic failure of a dam can occur by breaching the auxiliary spillway, or overtopping the dam. The integrity and stability of the auxiliary spillway is dependent upon the depth, velocity, and duration of flow, the vegetative cover, and the spillway’s resistance to erosion. Integrity of the embankment during overtopping is dependent on depth, velocity, and duration of flow, vegetative cover, and the embankment’s resistance to erosion.

Sandy Creek No. 23 is currently designed to handle 9.29 inches of rainfall in 6 hours without overtopping the embankment. The principal spillway is comprised of a standard two-stage riser, with a cumulative height of 23 feet. The low stage inlet allows water to drop 8.9 feet into a 30-inch diameter pipe that is 216 feet of reinforced concrete. All components associated with the principal spillway are in acceptable operating condition.

The auxiliary overflow spillway for Sandy Creek No. 23 was constructed as a trapezoidal channel with a minimum bottom width of 50-feet and 3:1 side slopes. It has a maximum freeboard of 4.0 feet and will begin to function with 6.19 inches of rainfall in a 6-hour period. Comprised of extensive vegetative cover but poor soils, it has a moderate potential for erosion.

Because Sandy Creek No. 23 was constructed as a class (a) low hazard structure, but is now documented as a class (c) high hazard structure, different safety standards apply. Specifically, NRCS criteria requires a high hazard structure be able to store, or safely pass, a Probable Maximum Precipitation [PMP] storm using the more conservative of a 6-hour or 24-hour storm duration. The PMP storm for Jackson County, Georgia is 30.2 inches in 6-hours or 40.8 inches in 24-hours. A 6-hour PMP storm event would result in the dam overtopping excessively eroding the backslope to the point of compromising dam integrity. Therefore, hydrologic capacity represents a high potential for dam failure.

*Seepage* – Embankment and foundation seepage can contribute to failure of an embankment by removing [piping] soil material through the embankment or foundation. As the soil material is removed, the voids created allow even more water flow through the embankment or foundation until the dam collapses due to internal erosion. Seepage that increases with increases in pool elevation is an indication of potential problems, as is stained or muddy water or “sand boils”. Foundation and embankment drainage systems can alleviate the seepage problem by removing the water without allowing soil particle to be transported away from the dam. Sandy Creek No. 23 does not exhibit obvious signs of excessive seepage. Therefore, seepage provides a low risk of dam failure.

*Seismic* – The integrity and stability of an earthen embankment are dependent upon the presence of a stable foundation. Foundation movement through consolidations, compression, or lateral movement can cause the creation of void within the embankment, separation of the principal spillway conduit joint, or in extreme cases, complete collapse of the embankment. The Sandy Creek Watershed is located in an area of low to moderate seismic risk; however, no historical events that would compromise structural integrity have been identified. Therefore, seismic activity reflects a low risk of dam failure.

*Material Deterioration* – Material used in the principal spillway system, the foundation and embankment drains, and the pool drainage systems are subject to weathering and chemical reaction due to natural elements within the soil, water, and atmosphere. Concrete risers and conduits can deteriorate and crack, metal components will rust and corrode, and leaks can develop. Embankment failure can occur from internal erosion cause by these leaks.

Sandy Creek No. 23 has a concrete riser and conduit, and embankment toe drains. Most material components are in good shape as a result of O&M activities by the dam’s operator. NRCS, the Georgia Soil and Water Conservation Commission, and the Georgia Environmental Protection Division’s Safe Dams Staff, for the purpose of inspecting various components of the dam, made this determination based on numerous site visits to the dam and a visual inspection conducted by EPD in March, 2008. The principal spillway riser and conduit had no evidence of corrosion, however there were vines growing on the trash rack. In addition, erosion was observed behind pipe support on the left side of the spillway outlet, and both ends of toe drains were rusted out and missing their rodent barriers. Therefore, material deterioration represents a low risk of dam failure.

#### **CONSEQUENCES OF DAM FAILURE:**

The exact mode and timing of a dam failure are extremely difficult to predict. In analyzing the failure of Sandy Creek No. 23, a worst case scenario is conceived. Specifically, a sunny day breach, with no advanced warning is assumed. Currently, overtopping due to excessive hydrologic loading is the most probable cause of failure. If the Sandy Creek No. 23 were to suddenly fail at a high reservoir stage (auxiliary spillway crest to top of dam), regardless of failure mode, the downstream stages and impacts would be similar to those described in the previous section on breach analysis. The impacts of a catastrophic failure of Sandy Creek No. 23 would jeopardize 1 inhabited structure and 5 roads, placing 25 residents and numerous commuters at fatal risk.

## **ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY**

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### **STRUCTURAL – LABYRINTH SPILLWAY AND ALTERATION OF PSP RISER:**

Two structural alternatives involved installing labyrinth spillways with widths of 130 feet and 157 feet on the embankment of Sandy Creek No. 23. These alternatives would also require construction near the principal spillway which might necessitate alterations to the riser structure. The following additional factors were considered in construction of the labyrinth spillways with widths of 130 feet and 157 feet.

- Due to space constraints at the site there would be difficulties encountered in trying to fit these labyrinth weir structures into the space available on the embankment, and
- Installation of weirs with these widths and lengths of the labyrinth cycles would require construction in close proximity to the PSP riser structure.

Although this option is conceptually simple, the factors listed above impose severe limitations on its implementation. Therefore, this alternative was excluded from further consideration because of auxiliary spillway space constraints and its effects to the riser structure.

### **NON-STRUCTURAL – RELOCATE DOWNSTREAM HAZARDS:**

Removing downstream hazards would allow the existing structure to remain unchanged. This would require that all structures [homes, recreational facilities, businesses, etc.] be removed from the dam breach zone and relocated elsewhere. Four road crossings would also have to be upgraded to state highway standards. The following additional factors were considered in enlarging the auxiliary spillway:

- A minimum of 1 house residence with an average property value of \$140,000 would have to be relocated,
- Upgrading 4 rural bridges to primary state bridge standards is cost prohibitive,

A preliminary cost estimate for this alternative exceeds \$ 4,000,000, making this alternative financially infeasible. Also this alternative was not acceptable to the public, therefore, this alternative was excluded from further consideration.

## **DESCRIPTION OF ALTERNATIVE PLANS**

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### **NO ACTION:**

Under this alternative, no additional federal funds would be expended and no additional benefits would accrue beyond those associated with the original project. Therefore, EPD would mandate the removal of the dam for the purpose of removing the hazard in the interest of public safety and bill the Sponsors for expenses.

Dam removal, or controlled breach, would be accomplished by cutting out a section of the embankment down to the valley floor. Remnants of the embankment would be shaped to a 2:1 slope from the valley sides of either channel side. Approximately, 9,285 cubic yards of fill would be removed and disposed of and three acres of critical area treatment would be installed. Average annual adverse effects associated with this alternative are estimated to be \$176,084. These effects are associated with flood damaged roads, bridges and utilities and the loss of property values and recreational opportunities. ESTIMATED COSTS - \$411,264.

### **DECOMMISSION DAM:**

To date, sediment has accumulated at a rate of .67 acre-feet per year. A total of 24 acre-feet of sediment have accumulated below the normal pool elevation. An additional 7.1 acre-feet of aerated sediment has accumulated above the normal pool elevation. Most of the sediment has accumulated in the upper reaches of the reservoir. Decommissioning Sandy Creek No. 23 would involve removing the floodwater retarding capacity by cutting out a section of the embankment down to the valley floor. Remnants of the embankment would be shaped to a 3:1 slope from the valley sides of either channel side. Approximately 35,000 cubic yards of fill and accumulated sediment would be removed and disposed of from the earthen embankment and reservoir area. An estimated 7.20 acre-feet of accumulated sediment would be removed and disposed of and an additional eight acres of critical area treatment would be installed. Adverse average annual effects associated with this alternative are estimated to be \$176,084. These effects are associated with flood damaged roads, bridges and utilities and the loss of property values and recreational opportunities. ESTIMATED COSTS - \$1,769,376.

### **STRUCTURAL – ROLLER COMPACTED CONCRETE CHUTE SPILLWAY:**

This alternative plan consists of constructing a 350 foot wide ogee weir with roller compacted concrete [RCC] overtopping protection and chute spillway to protect underlying soil materials from erosion during overtopping. The RCC spillway will be constructed with an ogee weir at an elevation of 772.5 ft MSL with the top of dam raised 3.5 feet to an elevation of 779.0 ft MSL. Material excavated from the embankment to construct the spillway will be conveniently used as earth-fill to plug the existing auxiliary spillway. Once constructed, the backslope will be filled with topsoil and grassed. As designed in this watershed plan, Sandy Creek No. 23 will meet all current NRCS and state of Georgia dam safety and performance standards. Average annual beneficial effects associated with this alternative are estimated to be \$176,084. These effects are associated with the protection of roads, bridges and utilities and maintaining lakeside property values and recreational opportunities. ESTIMATED COSTS - \$3,166,800.

### **STRUCTURAL – LABYRINTH WEIR SPILLWAY AND RAISE TOP OF DAM:**

This alternative plan consists of constructing a 108 foot labyrinth spillway on the existing embankment at an elevation of 772.5 ft MSL. The top of dam would be raised 3.22 feet to an elevation of 779.72 ft MSL. As designed in this watershed plan, Sandy Creek No. 23 will meet all current NRCS and state of Georgia dam safety and performance standards. Average annual beneficial effects associated with this alternative are estimated to be \$176,084. These effects are associated with the protection of roads, bridges and utilities and maintaining lakeside property values and recreational opportunities. ESTIMATED COSTS - \$4,303,236

## **EFFECTS OF ALTERNATIVE PLANS**

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Alternative plans of action can result in a multitude of effects on resources upstream and downstream of Sandy Creek No. 23. This section describes anticipated effects on high and medium resource concerns identified by the project sponsors and by the public during public meeting on May 28, 2009. Effects of alternative plans of action on resource concerns of national importance are also included.

### **WATER QUALITY:**

*Existing Conditions* – Water quality in the reservoir appears to be in good condition. No water quality monitoring of the lake was conducted during this planning process. However, there are no streams or tributaries in the watershed area that are listed on the Georgia 303d list of impaired streams. Periods of turbidity associated with normal lake turnover in the spring have been observed during various site visits to the dam. Also, extreme turbidity was observed in the upper limits of northwest reach during the reservoir sedimentation survey. Functionally, the reservoir serves as a sediment trap, which also traps pollutants attached to sediment particles, improving water quality downstream.

*No Action [Future without Project]* – Water quality conditions downstream would degrade as deposited sediment, and any attached pollutants, are reintroduced into the aquatic environment. Sediment deposition would move from the bottom of Sandy Creek No. 23 to stream channels downstream, reducing the biological integrity for fish and wildlife habitat. Contaminants associated with deposited sediments would also be reintroduced into stream processes, potentially degrading water quality downstream. EPD would install erosion control measures to minimize detrimental effects associated with this alternative.

*Decommissioning* – Water quality conditions downstream would degrade as deposited sediment, and any attached pollutants, are reintroduced into the aquatic environment. Sediment deposition would move from the bottom of Sandy Creek No. 23 to stream channels downstream, reducing the biological integrity for fish and wildlife habitat. Contaminants associated with deposited sediments would also be reintroduced into stream processes, potentially degrading water quality downstream. NRCS would install erosion control measures to minimize detrimental effects associated with this alternative.

*Structural* - Water quality would continue to be protected by the sediment trapping aspects of Sandy Creek No. 23. The integrity of downstream aquatic environments would be maintained.

**PROPERTY VALUES:**

Existing Conditions – The Sandy Creek No. 23 project area has experienced extraordinary growth over the past 20 years. Developments are common with homes averaging close to \$140,000 downstream of Sandy Creek No. 23 and above \$425,000 each for those located on the lake itself. Current appreciation values continue to exceed the north Georgia average of 4.33 percent. Maintaining and protecting property values is the primary concern of local residents.

No Action [Future without Project] – Property values for homes adjacent to the lake would decrease by a minimum of 20% percent because the lake's added amenity value for each property would be removed. Property values for homes downstream would also decrease due to increased flooding. Future appreciation values would be below that of upland homes because of increased frequency in flooding.

Decommissioning – Property values for homes adjacent to the lake would decrease by a minimum of 20 percent because the lakes added amenity value for each property would be removed. Property values for homes downstream would also decrease due to increased flooding. Future appreciation values would be below that of upland homes because of increased frequency in flooding.

Structural - Property values would be maintained, both upstream and downstream of Sandy Creek No. 23. There are currently 4 homes with lakefront property. The estimated average annual property value protected, as a result of amenities associated with the lake, for these 4 homes is \$17,554. Property values for 1 home downstream would also be protected.

**FISH & WILDLIFE HABITATS:**

Existing Conditions – Fishing is a valued activity on Sandy Creek No. 23. The lake provides some 20.7 acres of fish habitat. Additionally, there is an estimated 7.1 acre-feet of aerated sediment that is providing habitat for small wildlife. Hydrophytic vegetation has been established on the aerated sediment and evidence of beaver activity was observed in these areas.

No Action [Future without Project] – Approximately 20.7 acres of current fish habitats would be lost and the value associated with fishing on Sandy Creek No. 23 would be lost. Fish habitats would be converted to that of small free-flowing streams in suburban northeast Georgia. Also, there would be an increase in approximately 20.7 acres of wildlife habitat, primarily for small non-game species [i.e. raccoon, opossum, squirrel, rabbit, etc.].

Decommissioning – Approximately 20.7 acres of current fish habitats would be lost and the value associated with fishing on Sandy Creek No. 23 would be lost. Fish habitats would be converted to that of small free-flowing streams in suburban northeast Georgia. Also, there would be an increase in approximately 20.7 acres of wildlife habitat, primarily for small non-game species [i.e. raccoon, opossum, squirrel, rabbit, etc.].

Structural – Approximately 20.7 acres of established fish habitat would be maintained. Non-market values associated with fishing for homeowners adjacent to the lake would remain. Concerns over potential loss of fish and wildlife habitat during construction would be reduced by ensuring lake levels are at normal pool elevation between March 1 and November 1.

**SEDIMENTATION:**

Existing Conditions – Sandy Creek No. 23 was built in 1963 with 89 acre-feet of sediment storage capacity. Since many residents do not understand sediment storage capacity, concerns regarding sediment accumulation were expressed and noted at the original public meeting. Concerns about water supply associated with sedimentation were also expressed; therefore, effects on these two resources concerns are combined.

To date, sediment has accumulated at a rate of .67 acre-feet per year. A total of .24 acre-feet of sediment have accumulated below the normal pool elevation. An additional 7.1 acre-feet of aerated sediment has accumulated above the normal pool elevation. Most of the sediment has accumulated in the upper reaches of the reservoir.

No Action [Future without Project] – Sediment currently deposited in the reservoir would become exposed and available for transport further downstream. Turbidity levels would increase markedly downstream, potentially impacting property values. Sediment deposition would move from the bottom of Sandy Creek No. 23 to stream channels downstream reducing the biological integrity for fish and wildlife habitat. Contaminants associated with deposited sediments would also be reintroduced into stream processes, potentially degrading water quality downstream.

Decommissioning – Sediment currently deposited in the reservoir would become exposed and available for transport further downstream prior to sediment removal and disposition. Turbidity levels would increase markedly downstream potentially impacting property values. Sediment deposition would move from the bottom of Sandy Creek No. 23 to stream channels downstream reducing the biological integrity for fish and wildlife habitat. Contaminants associated with deposited sediments could also be reintroduced into stream processes, potentially degrading water quality downstream in the short-term. However, sediment would be removed and the stream would have to be reconnected to adjacent floodplain areas either geomorphically or structurally. This also means removing a significant portion (or the entire footprint) of the existing dam so that not only the function of the stream but the floodplain is restored. Sediment would have to be stabilized by some method (removal, structurally, vegetative etc.). There would be increased concerns and challenges associated with disposing of sediment that are potentially contaminated with hazardous materials. The U.S. Environmental Protection Agency [EPA], Corps of Engineers, US-Fish & Wildlife Service, and Georgia Wildlife Resources Division also expressed concerns associated with sediment removal. In the end, sedimentation rates would reflect current erosion and sedimentation commensurate with existing land-use and development patterns.

Structural – Sandy Creek No. 23 drainage area is reaching its development potential. In fact, the watershed should be 60 percent developed within the next 50 years. It is estimated that an additional 33 acre-feet of sediment would accumulate in the reservoir over the next 50 years. Jackson County’s efforts to implement regulatory requirements under Phase II Storm Water rules would further augment this reduced accumulation rate. Therefore, the remaining sediment storage life of Sandy Creek No. 23 is well in excess of 50 years.

#### **FLOODING IN THE FLOODPLAIN:**

Existing Conditions – Sandy Creek No. 23 was built to protect cropland, and other agricultural lands, from flooding. Because flood storage is a primary function of this structure, the area subject to the 100-year flood downstream was narrowed significantly when Sandy Creek No. 23 was originally constructed. This has allowed development to occur in areas that were not suitable to before the dam was constructed.

No Action [Future without Project] – Flooding commensurate with that of pre-structure conditions would occur. Homes, business, and infrastructure would all experience increased flood frequencies. Flooding would increase significantly for 1 home. The collective negative average annual impact is estimated to be \$450.

Decommissioning – Flooding commensurate with that of pre-structure conditions would occur. A single resident would experience increased flood frequencies. Flooding would increase significantly for this 1 home. The collective negative average annual impact is estimated to be \$450.

Structural – Flood protection benefits realized downstream would be ensured for another 50 years.

#### **PUBLIC SAFETY:**

Existing Conditions – Sandy Creek No. 23 was built in 1963 as a low hazard class (a) dam. As such, it was designed to provide flood protection for rural and agricultural land uses. Now, the dam is a high hazard class (c) structure, however, it was not designed to provide the level of safety required for protecting downstream homes, businesses, and utility and transportation systems. There are 5 roads and 1 residence downstream in the breach zone creating the potential for loss of life.

No Action [Future without Project] – There would be a slightly increased risk to public safety through increased flood frequencies exposing individuals, particularly curious individuals, to floodwaters. Roads, bridges, and utility infrastructure would also be exposed to increase maintenance concerns that could pose a threat to public safety.

Decommissioning – There would be a slightly increased risk to public safety through increased flood frequencies exposing individuals, particularly curious individuals, to floodwaters. Roads, bridges, and utility infrastructure would also be exposed to increase maintenance concerns that could pose a threat to public safety.

Structural – Potential risk to human life and structures would be reduced for a minimum of 50 years. Flood protection benefits and their associated maintenance concerns would be maintained for 5 roads and utility infrastructure.

## **WETLANDS**

Existing Conditions – There are transitional floodplain wetlands adjacent to Sandy Creek No. 23, predominantly in the reservoir's upper reaches. Additionally, some 7.1 acre-feet of aerated sediment also functions as a wetland. Hydrophytic vegetation has become established and is helping to filter out additional sediment, and associated pollutants, prior to deposition in the lake during storm events.

No Action [Future without Project] – Removal of the embankment would facilitate a transition in the wetland habitats and types from lacustrine to riverine. Under this alternative the transition would be very gradual, as exposed sediment would require a long period of time to re-establish vegetative cover. Eventually 20.7 acres of lacustrine wetlands would be transformed to an estimated 12 acres of riverine wetlands.

Decommissioning – Removal of the embankment would facilitate a transition in the wetland habitats and types from lacustrine to riverine. Under this alternative the transition would be quick relative to the No Action alternative. Removing exposed sediment would hasten the natural regeneration of landforms, drainage patterns, and vegetation. Eventually 20.7 acres of lacustrine wetlands would be transformed to an estimated 12 acres of riverine wetlands.

Structural – Wetlands would be maintained under this alternative. The wetland composition that has evolved over the past 46 years would continue. Established vegetation would continue to provide beneficial function associated with wetlands in north Georgia [i.e. water quality enhancement, wildlife habitat, etc.].

## **THREATENED & ENDANGERED SPECIES:**

Existing Conditions – Preliminary investigations revealed no threatened or endangered species within the project area.

No Action [Future without Project] - There would be no effect on this resource concern.

Decommissioning - There would be no effect on this resource concern.

Structural - There would be no effect on this resource concern.

## **RECREATIONAL OPPORTUNITIES:**

Existing Conditions – While recreation is not a purpose of Sandy Creek No. 23, the reservoir is providing a number of upstream recreational user days that include, but are not limited to, fishing, boating, and swimming. During the reservoir sedimentation survey, fishing, boating, and swimming by individuals and groups of all ages was observed.

No Action [Future without Project] – There would be a loss of fishing, boating, and swimming user days in Sandy Creek No. 23. The average annual negative impacts associated with lost recreational opportunities on the lake alone are estimated to be \$96,000.

Decommissioning – There would be a loss of fishing, boating, and swimming user days in Sandy Creek No. 23. The average annual negative impacts associated with lost recreational opportunities on the lake alone are estimated to be \$96,000.

Structural – Fishing, boating, and swimming would be maintained upstream.

## **TRANSPORTATION:**

Existing Conditions – Sandy Creek No. 23 was built in 1963 as a low hazard class (a) dam and was not designed to provide the level of safety required for protecting downstream homes, business, and utility and transportation systems. There are 5 roads with bridges and 1 residence downstream creating the potential for loss of life.

No Action [Future without Project] – Removal of Sandy Creek No. 23 would lead to increased flooding downstream on 5 roads and bridges. This increased flooding would require additional maintenance activities from Jackson County to insure public safety is maintained. Average annual increased maintenance costs are estimated to be \$62,080.

Decommissioning – Removal of Sandy Creek No. 23 would lead to increased flooding downstream on 5 roads and bridges. This increased flooding would require additional maintenance activities from Jackson County to insure public safety is maintained. Average annual increased maintenance costs are estimated to be \$62,080.

Structural – Roads, bridges, and utility networks would continue to be protected. Expenses commensurate with normal operation and maintenance activities would continue.

**CULTURAL & HISTORIC PROPERTIES:**

Existing Conditions – Preliminary investigations within the project area and of associated databases revealed no cultural or historic properties within the project area. Land disturbance has occurred through development of the area around the structure, i.e. the power line right-of-way, the sewer line, buildings, and disturbance during the actual construction of the structure in the early 1960s.

No Action [Future without Project]- There would be no effect on this resource concern.

Decommissioning - There would be no effect on this resource concern.

Structural - A summary of the project, accompanied by maps and aerial photographs, was provided to the Georgia State Historic Preservation Officer on May 3, 2009. As a result, passive concurrence has been received. The probability of discovering a new site is low but if cultural resources are encountered during the construction activities associated with rehabilitation of the dam, procedures outlined in NRCS General Manual [GM] 420, part 401 and the agency's Cultural Resources Handbook (GM 420, Part 601) would be followed.

**AIR QUALITY:**

Existing - Daily smog alerts are posted to advise residents of potential health concerns associated with outdoor activities.

No Action [Future without Project]- There would be a short term effect on this resource concern, as construction would take place during late fall or winter months.

Decommissioning - There would be a short term effect on this resource concern, as construction would take place during late fall or winter months.

Structural - There would be no long-term effect on this resource concern; however, there would be some short-term negative effects associated with the construction process itself [i.e. increased dust, exhaust, etc.].

**PRIME FARMLAND:**

Existing Conditions – There would be no effect on this resource concern.

No Action [Future without Project]- There would be no effect on this resource concern.

Decommissioning - There would be no effect on this resource concern.

Structural - There would be no effect on this resource concern.

**Table D. Summary and Comparison of Candidate Plans of Action**

<b>Effects</b>	<b>No Action</b>	<b>Decommission</b>	<b>Structural-RCC [NED]</b>
Structural	SC No. 23 EPD mandates removal at Sponsor expense	Constructed breach of SC No. 23; remove accumulated sediment	Upgrade SC No. 23 to meet dam safety criteria
Project Investment	\$411,264	\$1,769,376	\$3,166,800
<b>National Economic Development Account</b>			
Beneficial Annual	\$ 0	\$ 0	\$176,084
Adverse Annual	\$ 21,234	\$ 91,353	\$164,699
Net Beneficial	\$ (21,234)	\$ (91,353)	\$ 11,385
<b>Environmental Quality Account</b>			
Fish & Wildlife Habitats	Loss of 20.7 acres of aquatic habitat	Loss of 20.7 acres	Maintain habitat for 50 years
Sedimentation	33 acre feet sediment delivered to streams	33 acre feet of sediment delivered to streams	33 acre feet of sediment stored
Water Supply	Loss of 20.7 acre lake	Loss of 20.7 acre lake	Maintain 20.7 acre lake
Water Quality	Decreased due to more sediment in streams	Decreased due to more sediment in streams	Protected due to sediment trapping
Air Quality	No Effect	Short Term Neg. Effect	Short Term Neg. Effect
Wetlands	Transition to Riverine	Transition to Riverine	Maintain current wetlands
T&E Species	No Effect	No Effect	No Effect
<b>Other Social Effects Account</b>			
Avg., Ann. Flood [\$] Damages	Increased flooding	Increased flooding	Continued flood protectn
Public Safety	Slight increased risk due to increased flooding	Slight increased risk due to increased flooding	Risk are mitigated
Property Values	Decreased by 20+ %	Decreased by 20+ %	Values protected
Recreation	Loss of 8,000 annual user days of boating, swimming, and fishing activities	Loss of 8,000 annual user days of boating swimming, and fishing activities	8,000 annual user days of boating, swimming, and fishing activities are protected
Road/Bridge/Utility	Increased maintenance 4 roads and bridges	Increased maintenance on 4 roads and bridges	Maintenance on 4 roads and bridges protected
<b>Regional Economic Development Account [Positive Effects/Negative Effects Annualized]</b>			
Jackson County	\$ 0/\$12,740	\$ 0/\$ 54,812	\$ 105,650/70,852
Rest of Georgia	\$ 0/ \$8,494	\$ 0/\$ 36,541	\$ 70,434/47,235

**RISK AND UNCERTAINTY:**

Assessments, considerations, and calculations in this plan are based on a 50-year evaluation period. Under the Georgia Safe Dams Initiative, which is a state funded program to address dam safety issues, the State Attorney General has issued an opinion for local county governments stating that no local governing authority may enter into an agreement exceeding a period of 50-years. However, assessments and evaluations of sediment storage capacity and material components have concluded that the service life of Sandy Creek No. 23 will continue well beyond the original service life of 2065.

Impacts of each evaluated alternative were identified based on the occurrence of the 100-year 24-hour storm event. Associated monetary flooding impacts of downstream houses were based on the National Flood Insurance Program's Actuarial Rate Review. National averages were applied to local real estate value in identifying the value of potential damages. Actual damages occurring from the 100-year storm event could realistically be much different depending on rainfall duration, topography, future development, and other factors.

Population increases within Jackson County over the next 50 years could cause transportation and utility facilities to reach their maximum handling capacity. Based on recent trends, it is likely that future upgrades and additional infrastructure will be built within or near the watershed. However, because the location is uncertain for any future development the potential damages to roads, bridges and utilities that were evaluated were based on current conditions within the watershed and downstream of Sandy Creek No. 23.

With only 420 acres in the watershed left to be developed, it is also relatively uncertain what, if any, additional residential area, business or industry will be developed in the near future. The county is currently focusing on an aggressive countywide program to preserve as much green space as possible and limit development. Because of this effort and uncertainty of future development the impacts from each alternative on potential future development in the watershed were not considered.

Adverse property value impacts resulting from each alternative that removed the dam were based on percentages from similar projects and previous studies within the state. The percent value decline was calculated for property within 1,000 feet of the lake. Property values within this area were averaged for simplicity. Without the lake actually being removed the real impact to property value is uncertain.

Impacts to water-based recreation on Sandy Creek No. 23 were estimated considering the fact that the lake will only be used by residents regardless of the alternative evaluated. Values were estimated by identifying general water based activities. It is assumed, but not certain, that the number of visitor use days would remain the same for the next 50 years because the number of residents would remain relatively constant

The objective of this project is to meet applicable public health and safety standards associated with watershed dams and to extend the life of existing structures. An exception to the NRCS standard will not be required to meet the State of Georgia standards.

From a financing and administration stand point, the Georgia and Water Conservation Commission is committed to fund 35 percent of the sponsor cost share amount to complete installation of the selected alternative and also perform the required maintenance on the upgraded structure for the next 50 years.

**RATIONALE FOR SELECTED PLAN:**

The Structural-RCC Alternative was developed to protect life and property, and to accommodate the maximum number of resource concerns identified during the initial scoping process at the public meeting held May 28, 2009. This alternative also included additional resource concerns that were identified in the planning process. When compared against the No Action and Decommission Alternatives, the Selected Alternative was identified to be the more acceptable alternative to the public and a technical advisory group, and was subsequently recommended to the Project Sponsor. The Recommended Alternative was then selected by the Sponsor. The Structural-RCC Alternative meets the Sponsor's objectives of bringing Sandy Creek No. 23 into compliance with current dam safety criteria, maintaining the current 100-year floodplain, and addressing resource concerns identified by the public.

The Structural-RCC Alternative is the alternative which maximizes NED benefits. The NED Plan is the National Economic Development Plan. NED benefits are calculated as the difference between average annual benefits and average annual costs.

## **CONSULTATION AND PUBLIC INVOLVEMENT**

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### **PROJECT SPONSORS:**

Original sponsoring organizations include the Jackson Board of Commissioners, Oconee River Soil and Water Conservation District, and the Georgia Soil and Water Conservation Commission. At the initiation of the planning process, meetings were held with representatives of the original sponsoring organizations to ascertain their interest and concerns regarding the Sandy Creek Watershed. The Georgia Soil and Water Conservation Commission agreed to serve as “lead sponsor”, being responsible for leading the planning process with assistance from NRCS. As lead sponsor they also agreed to provide non-federal cost-share, property rights, operation and maintenance, and public participation during the planning process. Meetings with the project sponsors were held throughout the planning process. Project sponsors provided representation at planning team, technical advisory and public meetings.

### **PLANNING TEAM:**

An Interdisciplinary Planning Team provided for the “technical” administration of this project. Technical administration includes tasks pursuant to the NRCS nine-step planning process, and planning procedures outlined in the NRCS-National Planning Procedures Handbook. Examples of tasks completed by the Planning Team include, but are not limited to the following:

- Preliminary Investigations,
- Hydrologic Analysis,
- Reservoir Sedimentation Surveys,
- Economic Analysis,
- Formulating and Evaluating Alternatives, and
- Writing the Watershed Plan - Environmental Assessment.

Data collected from partner agencies, databases, landowners, and others throughout the entire planning process, were evaluated at regular Planning Team meetings. Informal discussions amongst the planning team, partnering agencies, and landowners were conducted throughout the entire planning period.

### **TECHNICAL ADVISORY GROUP:**

A Technical Advisory Group was developed to aid the Planning Team with the planning process. The following agencies were involved in the development of this plan and provided representation on the Technical Advisory Group:

- Jackson County Board of Commissioners
- Oconee River County Soil and Water Conservation District
- Georgia Department of Natural Resources, Environmental Protection Division [EPD], Safe Dams Program
- Georgia Department of Natural Resources, Wildlife Resources Division [WRD], Game and Fisheries Section
- United States Environmental Protection Agency [EPA]
- USDA, Natural Resources Conservation Service [NRCS]
- USDI, Fish and Wildlife Service [F&WS]
- US Army Corps of Engineers [COE]

### **PUBLIC PARTICIPATION:**

A public meeting was held on May 28, 2009 to explain the Watershed Rehabilitation Program and to scope resource problems, issues, and concerns of local residents associated with the Sandy Creek No. 23 project area. Potential alternative solutions to bring Sandy Creek No. 23 into compliance with current dam safety criteria, and continue providing flood protection benefits, were also presented to meeting participants to provide input on issues and concerns to be considered in the planning process, and which planning alternative [i.e. No Action, Decommission, Structural, Non-Structural] was most desirable.

### **PLAN DEVELOPMENT AND REVIEW:**

A Drafted version of this Watershed Plan - Environmental Assessment [EA] was submitted to the NRCS-National Water Management Center, Project Sponsors, Planning Team, Technical Advisory Group, and the Georgia State Clearinghouse for formal Interagency Review. A Federal Register Notice was developed and published to advertise the Draft Plan and EA, along with a Finding of No Significant Impact [FONSI]. After a 45-day review period, comments received were incorporated into the Final Watershed Plan - EA.

## RECOMMENDED PLAN

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### MEASURES PROPOSED:

#### **Roller Compacted Concrete Chute Spillway.**

This selected plan consists of constructing a 350 foot wide roller compacted concrete [RCC] symmetric convergence chute spillway to protect underlying soil materials from erosion during overtopping. The RCC spillway will be constructed with an ogee-crested weir control section at an elevation of 772.5 ft MSL. Material excavated from the embankment to construct the spillway will be used as earth-fill to plug the existing auxiliary spillway. Once constructed, the backslope will be filled with topsoil and grassed.

#### **Comparison of Structural Physical Data**

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<b>Sandy Creek No. 23</b>	<b>Unit</b>	<b>As Built</b>	<b>Planned</b>
Surface Area	Acres	20.7	20.7
Elevation, Top of Dam	MSL	776.5	779.0
Elevation, Principal Spillway [Low Stage]	MSL	755.9	755.9
Elevation, Auxiliary Spillway	MSL	772.5	772.5
Principal Spillway	Type	Concrete	Concrete
Auxiliary Spillway	Type	Earthen	Concrete
Sediment Storage	Acre-Feet	89	89

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### MITIGATION:

No wetland, stream, threatened and endangered species, or cultural resources mitigation is required for the proposed alternative.

### PERMITS AND COMPLIANCE:

Installation of the selected plan will bring Sandy Creek No. 23 into compliance with current dam safety criteria in an environmentally acceptable manner. Below is a list of the permit and compliance issues addressed during this planning process and their final disposition:

- Permit - Safe Dams Operating [State of Georgia] - The dam operator, Jackson County, will be responsible for obtaining a "Safe Dams Permit" from EPD upon completion of the planned improvement.
- Permit - Section 404 Clean Water Act - Will not be required for construction as this action falls under Nationwide Permit No. 37. Nationwide 37 will be issued.
- Compliance - Endangered Species Act, Section 7 Consultation – Not required per consultation with US Fish and Wildlife Service and Georgia Wildlife Resources Division.
- Compliance - National Historic Preservation Act - Compliance documented via consultation with State Historic Preservation Officer
- Compliance – Flood Easements – No additional flood easement required.

### COSTS:

Estimated costs for installing the project are shown in Tables 1 and 2. Total annualized costs are shown in Table 4. The watershed agreement shows the actual cost sharing between federal funds and other funds.

### INSTALLATION AND FINANCING:

The RCC spillway will be installed in year one of the evaluation period. During installation, equipment will not be allowed to operate when conditions are such that soil erosion, water, air, and noise pollution cannot be satisfactorily controlled. Vegetation will be established immediately following construction on all land disturbed by construction activities. Plants for erosion control and wildlife habitat will be selected based upon the installation season, soils, surrounding vegetation, and sponsor preference.

NRCS will be responsible for the following:

- Providing contract administration technical assistance,
- Providing construction management technical assistance [Inspector, Contracting Officer Technical Representative]

- Providing financial assistance equal to 65 percent of eligible project costs, not to exceed 100 percent of actual construction costs.
- Certifying, in conjunction with EPD, completion of all installed measures
- Executing a Project Agreement with project sponsors to obligate funds for cost-share payments

The Georgia Soil and Water Conservation Commission will be responsible for the following:

- Installation of all planned measures,
- Providing financial assistance at a rate equal to, or greater than, 35 percent of eligible project costs,
- Securing all needed permits, easements, and rights for installation, operation, and maintenance,
- Providing local administrative services necessary for installation of the project;
- Executing an Memorandum of Understanding with NRCS to provide a framework within which cost-share funds are accredited,
- Executing an Operation and Maintenance Agreement for Sandy Creek No. 23 with NRCS,
- Executing a Project Agreement with NRCS to obligate funds for cost-share payments,
- Providing contract administration for construction,
- Acquiring a Safe Dams Permit from EPD upon completion of installed measures, and
- Administering and enforcing adopted floodplain management regulations.

Other Organizations

- No other organizations are involved.

**OPERATION, MAINTENANCE, AND REPLACEMENT:**

Measure installed in this plan, and previously installed measures, will be operated and maintained by the sponsors for a period of 50 years with technical assistance from federal, state, and local agencies in accordance with their delegated authority. A new O&M agreement will be developed for Sandy Creek No. 23, and will be executed prior to signing a project agreement. The O&M agreement will specify responsibilities of the sponsors and include detailed provisions for retention, use, and disposal of property acquired or improved with federal cost sharing. Provisions include free access of district, state, and federal representatives to inspect all structural measure and their appurtenances at any time. The OM&R Agreement will be developed based on guidelines found in the National Operations and Maintenance manual.

**EMERGENCY ACTION PLAN:**

The sponsors will provide leadership in developing an Emergency Action Plan (EAP) and will update the EAP annually with local emergency response officials. NRCS will provide technical assistance in preparation and updating of the EAP. The purpose of the EAP is to outline appropriate actions and to designate parties responsible for those actions in the event of a potential failure of a floodwater retarding structure. The NRCS State Conservationist will determine that an EAP is prepared prior to the execution of fund obligating documents for construction of the structure. The EAP shall be reviewed and updated by the sponsors annually.

**Table 1. Estimated Installation Costs – Sandy Creek Watershed Structure No. 23, Georgia.**

INSTALLATION COST ITEM	ESTIMATED COST 1/		
	PL83-566 NRCS 2/	Other Than PL83-566	TOTAL
Sandy Creek FWRS No. 23	\$2,207,600	\$ 957,200	\$3,164,800
<b>TOTAL PROJECT COST</b>	<b>\$2,207,600</b>	<b>\$ 957,200</b>	<b>\$3,164,800</b>

1/ Price Base 2009

OCT 2009

2/ Federal Agency Responsible for Installation of Works of Improvements

**Table 2. Estimated Cost Distribution in Dollars<sup>1/</sup> – Sandy Creek Watershed Structure No. 23, Georgia.**

ITEM	Total PL83-566 Funds	Other Funds	TOTAL INSTALLATION COST
<b>Structural Measures</b>			
Floodwater Retarding Structure Number 23			
Construction	1,777,800	484,200	2,262,000
Project Administration	90,500	20,600	111,100
Technical Assistance	339,300	452,400	791,700
<b>TOTAL PROJECT COST</b>	<b>\$2,207,600</b>	<b>\$ 957,200</b>	<b>\$3,164,800</b>

1/ Price Base 2009

OCT 2009

2/ Other costs include, but are not limited to, architectural and engineering fees, inspection fees, etc.

**Table 3. Structural Dam Data with Planned Storage Capacity: Sandy Creek Watershed Structure No. 23, Georgia.**

Item	Unit	Amount
Class of Structure		C
Seismic Zone		2
Total Drainage Area Uncontrolled	Sq. Mi.	4.14
Condition II Curve Number		70
Time of Concentration [Tc]	Hours	2.03
Elevation, Top of Dam	Feet [MSL]	779.0
Elevation, Auxiliary Spillway Crest	Feet [MSL]	772.5
Elevation, Principal Spillway Low Stage	Feet [MSL]	755.9
Elevation, Principal Spillway High Stage	Feet [MSL]	770.0
Auxiliary Spillway Type		RCC w/ ogee
Auxiliary Spillway Bottom Width	Feet	350
Auxiliary Spillway Exit Slope	%	33.33
Maximum Height of Dam	Feet	37.22
Volume of Fill 1/	Cu. Yd .	8,733
Total Capacity 2/	Ac. Ft.	1740
Total Capacity 3/	Ac. Ft.	943
Sediment Submerged	Ac. Ft	76
Sediment Aerated	Ac. Ft	13
Floodwater Retarding	Ac. Ft	854
Surface Area		
Sediment Pool	Acres	20.7
Floodwater Retarding Pool	Acres	96.6
Principal Spillway Design		
Rainfall Volume	Inches	6.19
Runoff Volume	Inches	3.44
Capacity [low-stage max]	CFS	58
Capacity [high-stage max]	CFS	115
Dimension	Inches	30
Conduit Type		RCP
Frequency of Operation, Auxiliary Spillway	%	4
Auxiliary Spillway Hydrograph		
Rainfall Volume	Inches	9.29
Runoff Volume	Inches	6.21
Storm Duration	Hours	6
Velocity of Flow	ft/sec	8.21
Maximum Surface Elevation	Feet [MSL]	776.3
Freeboard Hydrograph		
Storm Duration 4/	Hours	6
Rainfall Volume	Inches	30.2
Runoff Volume	Inches	25.6
Velocity of Flow [Ve]	Ft./Sec.	10.22
Maximum Elevation	Feet	779.0
Bulk Length	Feet	N/A [Concrete]
Capacity		
Sediment	Inches	0.4
Floodwater Retarding	Inches	4.22

1/ Fill needed for dam rehabilitation

2/ Top of Dam

3/ Crest of Auxiliary Spillway

4/ Storm Duration is the more conservative of the 6-hour or 24-hour storm criteria

**OCT 2009**

**Table 4. Estimated Average NED Annual Costs (dollars1/)- Sandy Creek Watershed Structure No. 23, Georgia.**

EVALUATION UNIT	Project Outlays		TOTAL
	Installation Costs	Operation, Maint. and Replacement	
Sandy Creek No. 23	\$155,100	\$ 1,300	\$156,400
<b>TOTAL</b>	<b>\$155,100</b>	<b>\$ 1,300</b>	<b>\$156,400</b>

1/ Price Base 2009, Amortized over 50 years at a discount rate of 4.625%

OCT 2009

**Table 5A. Estimated Average Annual Watershed Protection and Damage Reduction Benefits – Sandy Creek Watershed Structure No. 23, Georgia. [Average Annual Dollars] 1/**

ITEM	Without Project	With Project	Damage Reduction Benefits
Onsite			
Real Estate	\$ 0	\$ 17,554	\$ 17,554
Sub-Total	\$ 0	\$ 17,554	\$ 17,554
Offsite			
Real Estate	\$ 0	\$ 450	\$ 450
Transportation/Utility	\$ 0	\$ 62,080	\$ 62,080
Recreation	\$ 0	\$ 96,000	\$ 96,000
Sub-Total	\$ 0	\$ 158,530	\$ 158,530
<b>TOTAL</b>	<b>\$ 0</b>	<b>\$ 176,084</b>	<b>\$ 176,084</b>

1/ Price Base, 2009

OCT 2009

**Table 6. Comparison of NED Benefits and Costs – Sandy Creek Watershed Structure No. 23, Georgia. [Average Annual Dollars] 1/**

EVALUATION UNIT	Ag. Related	Average Annual Benefit	Average Annual Cost	Benefit: Cost Ratio
Sandy Creek No. 23	\$ 0	\$176,084	\$156,400	1.13:1.00
<b>TOTAL</b>	<b>\$ 0</b>	<b>\$176,084</b>	<b>\$156,400</b>	<b>1.13:1.00</b>

1/ Price Base, 2009

OCT 2009

**Table E. Effects of the Selected Plan on Resources of National Concern.**

<b>Types of Resources</b>	<b>Principal Sources of National Recognition</b>	<b>Measurement of effects Resource Gain or Loss</b>
Air Quality	Clean Air Act, as amended (42. U.S.C 1857b. et seq.).	<b>No Effect</b>
Areas of particular concern within the coastal zone.	Coastal Zone management act of 1973, as amended (16 U.S.C. 1451 et seq.).	<b>No Effect</b>
Endangered and Threatened sp. critical habitat	Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.).	<b>No Effect</b>
Fish and Wildlife habitat	Fish and Wildlife Coordination Act (16 U.S.C. Sec. 661 et seq.).	<b>Maintain.</b> Protection of existing habitats
Floodplains	Executive Order 11988, Flood Plain Management	<b>No Effect</b>
Historic and cultural properties	National Historic Preservation Act of 1966, as amended (16 U.S.C. Sec 470 et seq)	<b>No Effect</b>
Prime and unique farmland	CEQ Memorandum of August 1, 1980; Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing the National Environmental Policy Act	<b>No Effect</b>
Water quality	Clean Water Act of 1977 (33U.S.C. 1251 et seq.)	<b>Maintain.</b> Reservoir will continue to store sediment, and associated pollutants
Wetlands	Executive Order 11990, Protection of Wetlands Clean Water Act of 1977 (42 U.S.C 1857h-7, et seq.).	<b>Maintain.</b> Wetland areas will be protected
Wild and scenic rivers	Wild and Scenic Rivers Act, as amended (16 U.S.C. 1271 et seq.).	<b>No Effect</b>

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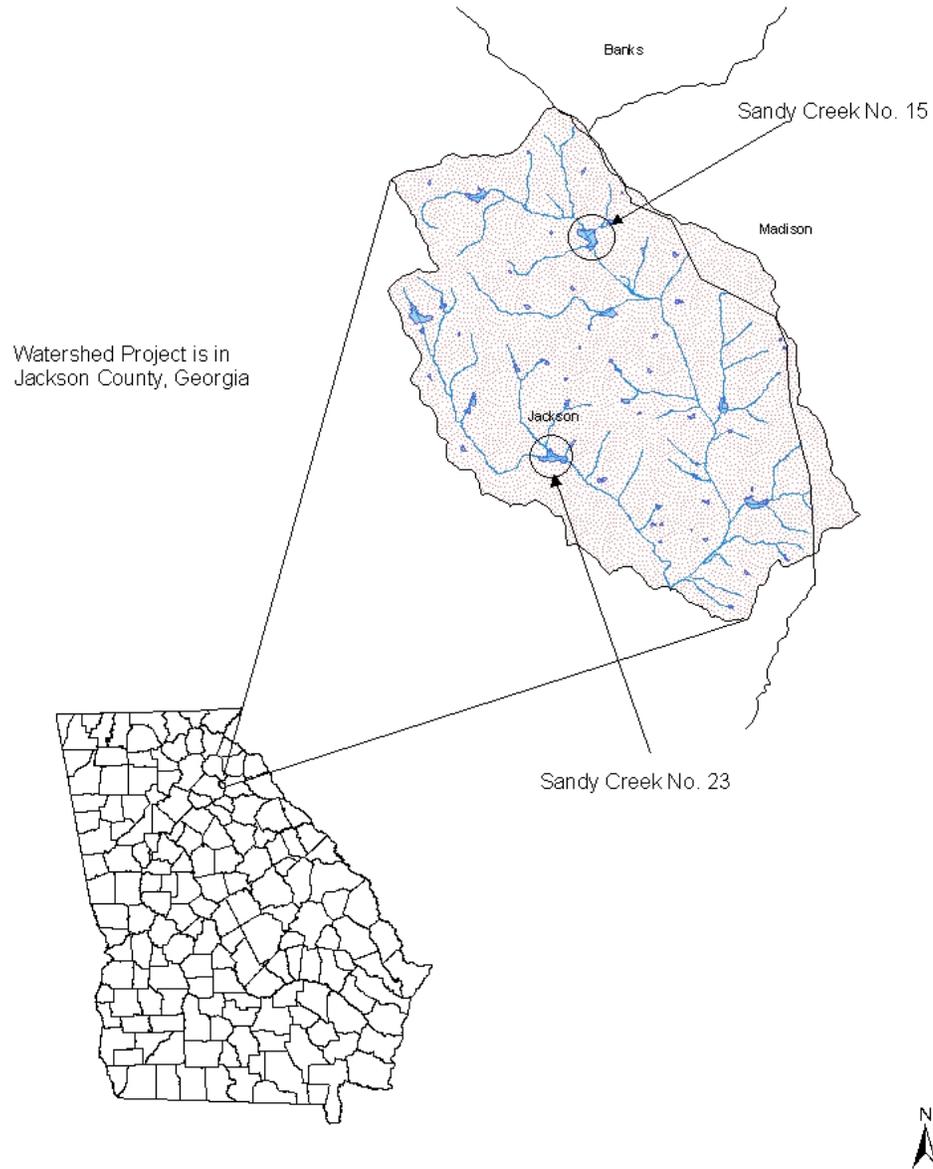
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**APPENDIX A  
GENERAL LOCATION MAP**

**Sandy Creek Watershed Project**

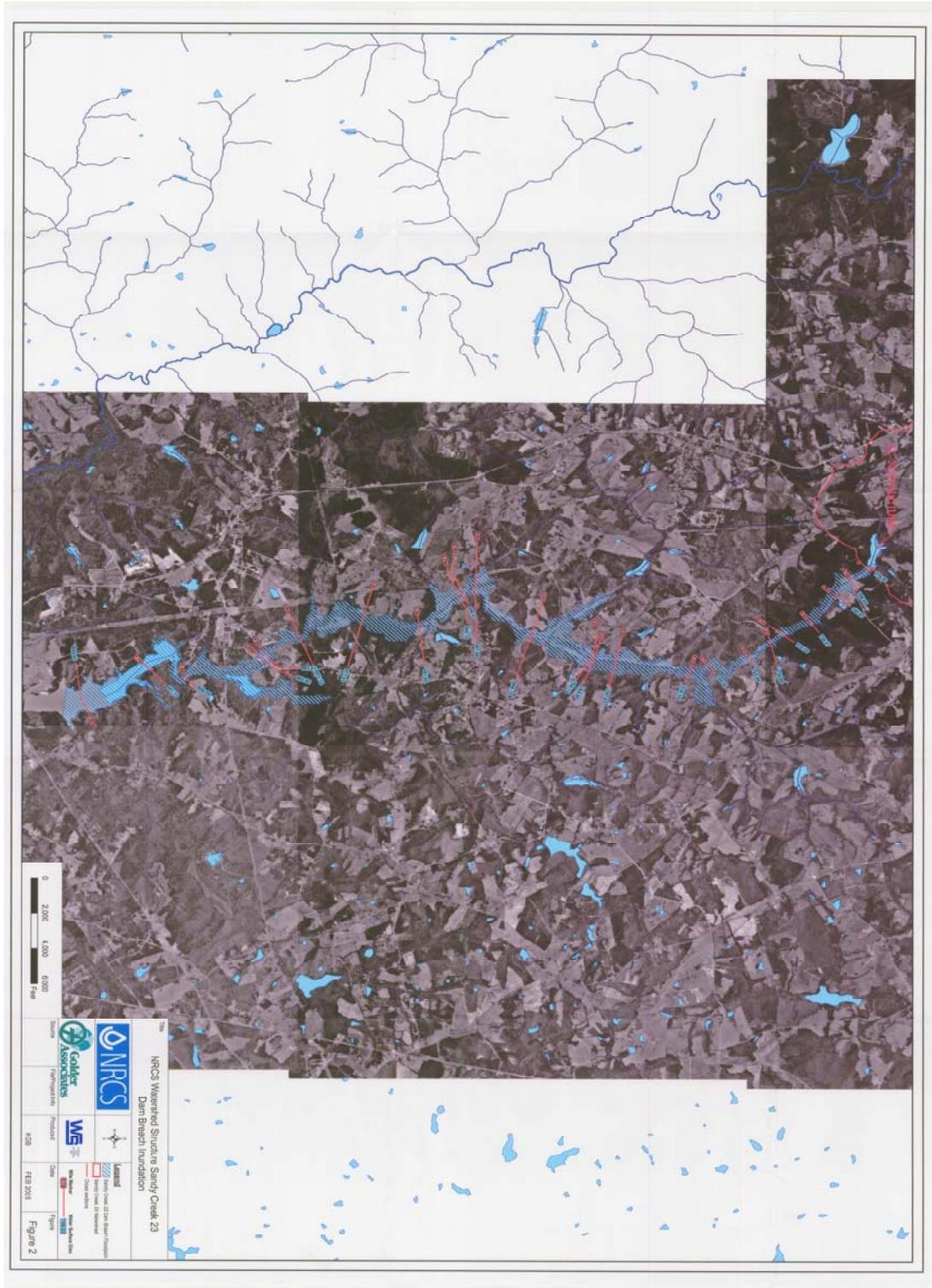


*General Location Map*



Watershed Project is in Jackson County, Georgia

## APPENDIX B BREACH INUNDATION MAP



## APPENDIX C PICTURES

**Figure C-1. Breach Zone - Houses**



**Figure C-2. Benefits – Property Values**



Property values for homes adjacent to the lake are 25 percent higher, on average, than for homes not adjacent to the lake. Upgrading the dam allows the lake to remain; thus, protecting property values.

**Figure C-3. Benefits – Flood Storage**



This picture provides a perspective of flood storage capacity of Sandy Creek Watershed Dam No. 23. Notice the truck in the background.

**APPENDIX D  
LETTERS AND ORAL COMMENTS**



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