

# DEVELOPING AND IMPLEMENTING A SOURCE WATER PROTECTION PLAN FOR MACON WATER AUTHORITY'S DRINKING WATER SOURCES

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**Abstract.** In 2003 the Macon Water Authority (MWA) developed Source Water Assessment Plans (SWAPs) for the Ocmulgee River and Lucas Lake intakes used for the regional water supply for Macon / Bibb County and the surrounding area. The SWAPs provided the background information on the potential contaminant sources and the associated risks to the intakes from these sources. The SWAPs did not however, nor were they required to by the Georgia EPD, make any recommendations on how to prevent potential contamination of a community's water supply. MWA decided to develop a Source Water Protection Plan (SWPP) to help prevent contamination. No other water utility in Georgia has developed a SWPP to protect its surface water supply. Awareness was raised in the community and surrounding area of the importance of source water protection. The SWPP was presented to the MWA Board in April 2005 for implementation.

## INTRODUCTION

In September 2003, the Macon Water Authority, with assistance from the Middle Georgia Regional Development Center (MGRDC), prepared Source Water Assessment Plans (SWAPs) for the Ocmulgee River and Lucas Lake (reservoir) intakes as required by the Georgia EPD. The Source Water Assessment Plans included three major sections:

1. The collection, inventory, and analysis of water quality data that was used as a good baseline to the quality of water at and in close proximity to the water source intakes.
2. The identification of potential sources of contamination within the approximate 300 square mile area of the 7 mile and 20 mile outer management zones (OMZ) of the watershed area that drains to the two intakes.

(See Figure 1)

3. The establishment of overall water supply watershed susceptibility rankings from the potential sources of contamination.

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In 2004 the Macon Water Authority decided to take a pro-active approach and develop a Source Water Protection Plan (SWPP). According to Sue Grunwald, Georgia EPD SWAP Coordinator, no other water utility in Georgia has developed a SWPP to protect their surface water supply. In 2004 the MGRDC was contracted by MWA to assist in developing the SWPP.

## DEVELOPMENT

The process for developing the SWPP began by establishing a team comprised of key staff members of the Macon Water Authority: The responsibilities of the team were:

- Review the Source Water Assessment Plans' potential contaminant sources
- Prioritize the potential contaminant sources
- Recommend protective strategy options for the potential contaminant sources
- Comment on the draft SWPP by MWA prior to adoption by MWA
- Implement the final SWPP as adopted by MWA

The first meeting of the SWPP team was held in September 2004. The team members were given an overview of the SWAPs for the Ocmulgee River and Lucas Lake intakes. Emphasis of the overview was placed on the susceptibility determination spreadsheets and the final susceptibility rankings for the potential contaminant sources. Based on the team's review of the final susceptibility rankings and consideration of other factors, the team identified and ranked the potential contaminant sources that should be the focus of the Source Water Protection Plan and which contact actions and BMPs (Best Management Practices) would be recommended for. The sources and their ranking, from higher risk to lower risk, are found in Table 1.

The SWPP team realized the most important initial action that occurs after a contamination event occurs in either the Ocmulgee River or Lucas Lake is prompt notification of the staff of the Amerson Water Treatment Plant. This is important because knowledge of a

contamination event allows staff to take immediate action to protect the drinking water plant and water distribution system:

- The Amerson WTP Ocmulgee River intake normally pumps water to Lucas Lake from which the water is then pumped through MWA's treatment plant and then to MWA's customers. MWA also has the option of bypassing Lucas Lake and pumping directly from the river to the water plant.
- If MWA is given prompt notice that a spill occurred into the Ocmulgee River above MWA's intake the pumping station can be shut down if needed so that the contaminant does not enter Lucas Lake. If this is done the water plant will continue to serve MWA's customers without effect because of the 6 billion gallons of water storage in Lucas Lake which could serve MWA's customers for at least 100 days.
- If prompt notice is not provided the contaminant will enter Lucas Lake and then possibly affect MWA's water treatment plant so that MWA would have to possibly shut down the lake pumping station. In this type of situation MWA would normally bypass Lucas Lake and pump directly from the river intake to the water plant, but if the river is too severely contaminated this could not be done.

The SWPP team directed the MGRDC and the MWA SWPP project manager to:

- Contact and meet with the responsible person(s) for each of the potential contaminant source locations to make them aware of the SWPP, ask for their assistance, and seek their suggestions.
- Investigate and recommend best management practices (BMPs) for each potential contaminant source location to protect the Ocmulgee River and Lucas Lake water sources.
- Investigate the feasibility of a real time water monitoring system for the Ocmulgee River. The purpose of this monitoring system would be to help water treatment plant operators be aware of water quality conditions that affect the Ocmulgee River water intake so that Lucas Lake and the water treatment plant are protected.
- Research and suggest education/collaboration program(s) to help make the public aware of the importance of protecting the Ocmulgee River and Lucas Lake.

## CONTACT ACTIONS

Contacts, including meetings and letters, were made with the twenty representatives from each of the six non-MWA potential contaminant sources. They were informed of:

- The importance of source water protection and MWA's plans for it
- MWA's emergency contact telephone numbers
- Best management practices they could use to protect source water

Contacts with the non-MWA potential contaminant sources resulted in statements and letters of cooperation from them, inclusion of the MWA water intakes into their emergency plans, and suggestions for improving emergency response including an annual spill drill.

For the two MWA potential contaminant sources existing procedures were reviewed by SWPP team members and changes, where needed, were made.

## PUBLIC EDUCATION

Recommendations were made in the SWPP to educate the public of the importance of source water protection by:

- A public information meeting
- Media press release about the Source Water Protection Program
- Presentations to school, civic, and environmental groups
- Articles in MWA's customer newsletter
- Public service announcements
- The use of Cox Cable public access channel 14
- Web page on MWA's website
- Collaboration with local agencies and groups, such as the Ocmulgee Heritage Trail and Adopt A Stream, in their efforts to educate the public

## WATER QUALITY MONITORING

The SWPP recommends that besides the ongoing monitoring for pH, conductivity, dissolved oxygen, turbidity, toxicity, fecal coliforms, and visual conditions of the two water intakes that:

- Continuous monitoring for oil/gasoline in the Ocmulgee River at the river intake should be used to detect possible spills. Petroleum will enter the water from railroad derailments, highway accidents, and surface runoff. Staff research has found that a number of water utilities monitor their intakes for oil and petroleum using an online detector and alarm system.
- Continuous monitoring of the chlorine dioxide addition of the water coming into the water plant from Lucas Lake (or directly from the river when the reservoir is bypassed) should be done to detect water quality changes and possible spills. Chlorine dioxide is a very powerful oxidant/disinfectant and it is added at the Amerson Water Plant's mixed raw water to oxidize manganese, iron, and organic compounds and to reduce pathogenic organisms. Continuous monitoring of chlorine dioxide would detect a change in the amount needed and thus possibly detect a contamination event. A secondary benefit of this instrumentation would be to be more efficiently use chlorine dioxide, which would reduce cost, and better help compliance with Georgia EPD and US EPA requirements for total organic carbon removal, chlorine dioxide/chlorite, disinfection byproducts, iron, and manganese.



**Table 1. SWPP potential contaminant source rankings**

SWPP Team Risk Ranking	Intake(s) affected	Potential Contaminant Source Location	Potential Contaminant Source	Potential Contaminants
1	Ocmulgee River	Norfolk Southern Corp. rail line along Ocmulgee River	Chemical/oil spills from freight trains.	Chemicals, petroleum oils and fuels
2	Ocmulgee River Lucas Lake	Jones County sewer system at River North subdivision	Sewage spills.	Pathogenic organisms
3	Ocmulgee River Lucas Lake	Roads, highways, and fuel facilities within SWAP management zones	Chemical/oil spills from transport vehicles.	Chemicals, petroleum oils and fuels
4	Ocmulgee River	Georgia Power Company Plant Scherer	Chemical/oil spills from equipment, storage, and transport.	Chemicals, petroleum oils and fuels
5	Ocmulgee River	MWA sewer system within SWAP management zone	Sewage spills	Pathogenic organisms
6	Ocmulgee River	City of Forsyth sewer system within SWAP management zone	Sewage spills	Pathogenic organisms
7	Lucas Lake	MWA Amerson WTP bulk chemical storage and truck deliveries	Spills from chemical storage and transport.	Chemicals / petroleum oils and fuels
8	Lucas Lake	Healy Point Country Club	Spills from above ground fuel storage tanks including fuel transport. Spills and improper application of pesticides, fertilizers, and herbicides on golf course.	Petroleum oils and fuels. Nutrients from fertilizers that cause algae, Aquatic toxicity from herbicides and pesticides, SDWA regulated herbicides and pesticides