

SOUTH CAROLINA WATER PLAN—SECOND EDITION

A.W. Badr^{1/}, Andrew Wachob^{2/}, and Joseph A. Gellici^{2/}

AUTHORS: ^{1/}Chief of Hydrology, ^{2/}Hydrologist, South Carolina Department of Natural Resources, PO Box 167, Columbia, SC 29202

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Abstract. In 2004, the South Carolina Department of Natural Resources published the second edition of the *South Carolina Water Plan*, a guide for managing the State's surface and ground water in order to maximize the use of this resource while protecting it for future use. One of the more important recommendations in this *Water Plan* is the proposal to regulate surface and ground water withdrawals. In order to sustain the resource and protect the environment and the rights of all water users, this edition recommends that the State be authorized to allocate and regulate surface and ground water withdrawals. The *Water Plan* also introduces a water-sharing strategy that relates lake inflows and lake levels to downstream releases and other lake withdrawals in an effort to balance and mitigate the negative impacts that water shortages have on all surface-water users.

INTRODUCTION

In 1998, the South Carolina Department of Natural Resources published the *South Carolina Water Plan* (Cherry and Badr, 1998), a guide for managing the State's surface and ground water resources. In the middle of that same year, South Carolina entered into one of the worst droughts in its history, lasting until late in 2002. That drought demonstrated that the State's water supply is not unlimited, and that careful management is needed to ensure water availability for future generations. The second edition of the *South Carolina Water Plan* (Badr and others, 2004) incorporates the experience of that drought and the lessons learned from it into the management strategies presented in the original *Water Plan*.

This edition of the *Water Plan* includes a review of South Carolina's ground and surface water resources, a discussion of water use in the State, an overview of existing water-quality regulations and programs, and a description of existing and recommended ground and surface water monitoring networks. It also discusses

many practices and technologies geared toward maximizing availability, such as water conservation, construction of new reservoirs, and aquifer storage and recovery programs.

Perhaps the most important elements introduced in this edition of the *Water Plan* are the recommendations to regulate surface and ground water withdrawals, and the proposed water-sharing strategy that relates lake inflows and lake levels to downstream releases and other lake withdrawals as a way to balance and mitigate the impacts that water shortages have on all surface-water users. This strategy emphasizes the need for all users to share the burden of water shortage during prolonged droughts.

Because much of its surface water is shared with neighboring states, it is important that South Carolina establish formal mechanisms with Georgia and North Carolina for the equitable apportionment of all water shared with these states in order to reduce potential disputes between the states, protect the flow regime of many of South Carolina's rivers, and extend the availability of water during severe droughts. The *Water Plan* recognizes that the effective management of the State's water resources is beyond the scope of any single agency and will require cooperation and shared responsibility among Federal, State, and local entities, as well as public and private parties.

This paper highlights those elements of the new *Water Plan* that may be particularly relevant to Georgia and the Savannah River basin.

REGULATING WATER USE

Regulating Ground Water Use

Ground water is a significant source of drinking water in South Carolina, supplying about 40 percent of the population, including virtually all the rural population. Overpumping of ground water has caused significant regional water-level declines in nearly half of the State's counties in the Coastal Plain. To protect aquifer systems

from permanent damage caused by overpumping and to ensure the long-term usefulness of the State's ground water resources, ground water withdrawals in excess of 3 million gallons per month should be regulated throughout the Coastal Plain. Currently, these regulations apply only to those counties along the coast and in the Pee Dee region designated as "Capacity Use" areas.

One of the challenges facing ground water management is determining when withdrawals should be restricted. The large areal extent of the State's aquifers and their wide range of hydrologic and physical properties may limit the application of generalized restriction criteria. Withdrawal-restriction criteria that are effective for an aquifer in one location may not be effective for that same aquifer in another location. Resource managers should consider policies—such as mandatory well spacing or reserving certain aquifers for a given use or uses—to minimize the need for restricted withdrawals.

Regulating Surface Water Use

South Carolina's streams usually have more than enough water to satisfy the demands of all water users, but during dry summers or prolonged droughts, streamflows can become unusually low, and demands for water can exceed the available supply. To maximize water availability, surface water use should be regulated, and allocation mechanisms should be established to control the distribution of water so that all users have a reliable water supply. During extended dry periods, reduced water availability may necessitate a reduction in offstream withdrawals, resulting in a water shortage for some users. Users of surface water should prepare for these occasional shortages by planning to supplement their water supply with water from storage facilities, ground water, or other water suppliers.

Interbasin Transfer of Water

The interbasin transfer of water involves moving water from one hydrologic basin (the origin basin) into another basin (the receiving basin), where it is used and discharged. The significant feature of interbasin transfer is that the water is completely removed from the origin basin, preventing its use by anyone downstream from the withdrawal point. Permits to allow interbasin transfers should reflect a scientific understanding of the water availability, and protect both basins of origin and receipt. Normally, there will be enough water in the origin basin so that transferring water to another basin will not result in detrimental water shortages in the origin basin, but if the origin basin is experiencing a water shortage, the transfer

of water out of that basin may aggravate the water shortage. Mechanisms should be included in the inter-basin transfer permits to make transferable volumes of water proportional to the available water volume in the origin basin: the less water available, the less water transferred. In that way, both basins share the burden during water shortages.

RESERVOIR MANAGEMENT

The State should play a major role in managing existing lakes to maximize the benefits from the lake water and to minimize conflicts among all upstream, downstream, and lake uses. Lake management should give equal consideration to all uses, including water supplies, hydroelectric power, fish and wildlife, water quality, recreation, flood control, and real estate. Complicating this management is the fact that many of the reservoirs that control South Carolina's surface water system are located partly or entirely in other states. Further complicating matters is the fact that the State has little direct control over the operation of these reservoirs.

Resource managers should evaluate each regulated stream in the State to determine the desired and minimum required flows just downstream from each impoundment. These flows are determined on the basis of permitted offstream withdrawals and required instream flows. During normal conditions, reservoirs should be operated so that releases are sufficient to ensure that desired downstream flows are always met. During droughts, the reservoir's drought contingency plan must be activated, and releases made according to the drought plan and the severity of the drought. Specific release schedules designed to meet downstream flow requirements should be incorporated into the Federal license, State operating permit, or Corps of Engineers operating plan that specifies release schedules. Reservoir operations should also be planned to ensure adequate average daily or instantaneous flows, rather than just meeting weekly average releases, and consideration should also be given to releasing water in such a way as to mimic natural seasonal fluctuations, where appropriate.

Each reservoir should have a drought contingency plan, specific to the particular uses and conditions of that lake, that associates reservoir water levels, drought conditions, and natural inflows with the allocation of lake water for all uses, including downstream releases. The drought contingency plan should minimize the likelihood of a reservoir's conservation pool becoming so depleted that

water is no longer available for public supplies.

During water shortages, reservoir releases should be reduced as the volume of water in the lake declines. Releases should equal or exceed the downstream desired flow requirements as long as the lake level is above the first water-shortage severity level. If the lake level declines to less than the first water-shortage severity level because of low inflow, downstream releases and lake withdrawals should both be reduced, but downstream releases must always satisfy minimum flow requirements. If a drought persists to the extent that running out of water becomes a realistic concern—for example, if the volume of usable storage is equivalent to only 100 days of lake withdrawals—downstream releases should be set equal to the inflow into the lake. If the water shortage continues until the lake level nears the bottom of the conservation pool and the volume of usable storage is almost exhausted—for example, equivalent to 10 days of lake withdrawals—further reductions in both lake withdrawals and downstream releases should be required.

INTERSTATE COOPERATION

Conflicting jurisdictions, authorities, and program objectives of the various government agencies and private organizations that have interests in the water resources of a basin greatly compound the complexity of effective water resources management. South Carolina should work to establish a river basin advisory committee for each of its four major basins. Each committee, made up of representatives from Federal, State, and local agencies and stakeholders, would develop a comprehensive basinwide water resources plan to optimize water use throughout that basin. Because the water in three of its four major basins is shared with neighboring states, South Carolina's State resource agencies, the State legislature, and the Governor must work together with their counterparts in Georgia and North Carolina, as well as with Federal agencies such as the Corps of Engineers and the Federal Energy Regulatory Commission, to develop basinwide management plans. To promote interstate cooperation and reduce potential disputes among these States, formal mechanisms meant to provide equitable water apportionment, such as interstate compacts or memoranda of agreement, should be developed among these States.

The need for cooperation between South Carolina and Georgia has been recognized on a technical level, with the Savannah River Basin Comprehensive Water Resources

Study, an ongoing cooperative project between Georgia, South Carolina, and the Corps of Engineers, with the goal of balancing the many uses and demands for the entire Savannah River basin with the operation of the Corps' reservoirs. On a political level, the need for this cooperation must also be recognized with formal agreements between Georgia, South Carolina, and the Federal government to work together to manage the Savannah River.

LITERATURE CITED

- Badr, A.W., A. Wachob and J.A. Gellici, 2004. South Carolina water plan—second edition: South Carolina Department of Natural Resources, 120 p.
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