

**Proposed Bladen County Capacity Use Investigation  
Scope of Work and Timeline for Completion**

North Carolina  
Division of Water Resources  
Environmental Management Commission

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## Introduction

The Division of Water Resources (DWR) *Bladen County Preliminary Capacity Use Assessment* was distributed on October 2, 2002. Upon review of that report and input from representatives of the Lumber River Council of Governments and Elizabethtown, the Water Allocation Committee of the Environmental Management Commission requested that DWR provide a scope of work for a capacity use area investigation and a proposed timeline. This current report to the Committee describes information collected since the October meeting relevant to the ground water situation in the Bladen County area and outlines a proposed capacity use area investigation.

Since the October report, the Division received water withdrawal data (September 1995 through September 2002), ground water levels (September 1992 through October 2002), and well water sample analyses collected at the wellheads at the time of construction from Smithfield Packing at Tar Heel, Bladen County.

## New Information from Smithfield Packing

- Chloride concentrations in water from six Smithfield wells at their dates of construction ranged between 33 and 286 milligrams/liter (parts per million). A concentration above 250 mg/l chloride is considered salt water. This either represents salty water from the Lower Cape Fear aquifer (if present) or the toe of the salt-water interface in the Upper Cape Fear aquifer. DWR's understanding of the hydrogeologic framework (the horizontal and vertical locations of aquifers and confining units) in this area is limited, partly because geophysical logs do not exist for wells at Smithfield Packing.
- Water levels at Smithfield Packing responded to the closure of Alamac Knit Fabrics in Elizabethtown (see figure 1). The leveling off of water levels measured at Smithfield Packing (identified in the October report) was not due to changes in withdrawals at the plant. In fact, water levels appear to continue to decline after the Alamac closure effect, at a rate similar to the rate of decline before closure. This is substantiated by the Dupont well to the northwest of Smithfield, which continues to decline (mostly as a result of Smithfield withdrawals).
- Upper Cape Fear water levels are drawn down into the UCF confining unit and near the top of aquifer. Based on the interpolated hydrogeologic framework, the top of UCF confining unit is at 220 feet below land surface and the top of the UCF aquifer is at 265 feet below land surface, whereas water levels are between about 230 and 260 feet below land surface. In the recent past, water levels have been measured by Smithfield as deep as 290 feet below land surface.

## What is a Capacity Use Area Investigation?

As stated in the Water Use Act of 1967, in section GS 143-215.13(c), the "Commission [EMC] may declare and delineate capacity use areas" after directing the Department to investigate and report to the commission. A Capacity Use Area investigation must have the following components:

1. consultation with all interested persons, groups and agencies;
2. consideration of all factors relevant to the conservation and use of water in the area;
3. indication of whether the water use problems involve surface or ground waters or both;
4. recommended boundaries of a capacity use area;
5. alternative measures to regulation;
6. a written report to the EMC with a recommendation as to whether a capacity use declaration should be made.

The EMC may, upon review of the investigation report or after evaluation of measures taken in the absence of regulation, declare a capacity use area and adopt a rule delineating its boundaries.

### Proposed Capacity Use Investigation Scope of Work and Timeline

Of the six required components, number four is the most difficult and time consuming to answer. Boundaries of a capacity use area may be set at political boundaries for ease of recognition, but they need to be justified based on reasonable scientific grounds. Establishing boundaries to a proposed capacity use area will depend on more detailed mapping of all of the hydrogeologic units. This is especially true of the Upper Cape Fear aquifer, which seems to be most affected by large water withdrawals.

To accomplish this goal, substantial investments must be made to drill exploratory boreholes, run geophysical logs, and establish monitoring well stations at several key locations in the area. Each station must have four (or more) wells to monitor water levels in each of the major aquifers. Some key locations have existing, borehole information and one or two existing wells. These locations must have additional wells drilled to tap the other major aquifers and complete the stations.

At this time, we recognize the need for ten boreholes and monitoring stations in parts of Bladen (5), Cumberland (3), and Robeson (2) counties (about 40 additional wells). Hydrogeologic information and water level monitoring from these stations will allow aquifer correlation and will help establish natural boundaries to the aquifer system. Additional investment must be made to add automatic water level recording instrumentation to many monitoring wells in the greater Bladen County region.

Due to time constraints of well construction and the need to gather water levels over a certain time period to recognize patterns and associate with an aquifer, three years is required after funding is identified and allocated. Thus, a timeline for a capacity use investigation is dictated by the need to establish this basic level of hydrogeologic understanding.

Other components of the proposed capacity use area investigation could easily be accomplished within the three-plus year time frame. There is an active interest group in the Bladen County area, which is already available for consultation. Many large water users have been identified by the Lumber River Council of Governments. This is clearly a ground water supply issue that may cause an increase in use of surface waters (especially the Cape Fear River).

Within a capacity use area or through independent means, alternate sources of water are necessary to reduce the reliance on the Upper Cape Fear aquifer.

Upper Cape Fear ground water level equilibration above the top of the aquifer due to increased use of alternate supplies may signal a situation where capacity use area designation is unnecessary. For example, a step can be taken by Smithfield to make use of the Black Creek aquifer using shallower wells (less than about 220 feet deep).

However, there may be pitfalls associated with this alternative. It may allow recovery of the Upper Cape Fear aquifer and in large part remove the problem, however Black Creek aquifer use by Smithfield may cause problems with neighboring wells that make use of that aquifer. Higher resolution hydrogeologic mapping may reveal stress patterns in the Black Creek aquifer that are unnoticed today. The Alamac Knit Fabrics plant may get a new tenant whose water withdrawals may further complicate Upper Cape Fear water level problems.

The Division of Water Resources recommends that the Committee and EMC launch a capacity use area investigation for the Bladen County area. This process will take about four and a half years. Three years to collect and process the new hydrogeologic information plus the time needed to establish funding for the hydrogeologic framework expenses, which is estimated to be one and a half years.

<b>Proposed Bladen County Capacity Use Area Investigation Timeline</b>		
<b>Activity</b>	<b>Start Time</b>	<b>Finish Time</b>
Review of Existing Hydrogeologic Information	Begun	Winter 2003
Consultations	Begun	Spring 2007
Alternative Measures Analysis	Winter 2005	Spring 2007
Borehole Drilling & Monitoring Well Construction	Summer 2004	Winter 2006
Water Level Monitoring	Winter 2005	Summer 2007
Report Generation	Spring 2007	Summer 2007

**Figure 1. Water Levels and Withdrawals from Smithfield Packing**

