



## ORANGE WATER & SEWER AUTHORITY

*Quality Service Since 1977*

AGENDA #5d

April 28, 2006

Mayor Mark Chilton  
Town of Carrboro  
310 West Main Street  
Carrboro, NC 27510

Mayor Kevin Foy  
Town of Chapel Hill  
306 North Columbia Street  
Chapel Hill, NC 27516

Chairman Barry Jacobs  
Orange County Board of  
Commissioners  
Post Office Box 8181  
Hillsborough, NC 27278

Dear Mayor Chilton, Mayor Foy, and Chairman Jacobs:

Last night the OWASA Board of Directors unanimously agreed to declare a **Water Supply Advisory** due to the persistent conditions of severe drought in the North Carolina Piedmont and abnormally low streamflow in the tributaries to University Lake and the Cane Creek Reservoir. Yesterday's rainfall was a welcome bonus, but has not ended the drought conditions. A complete copy of the Board's agenda item, along with an additional "Tale of Two Aprils" update, are attached.

As noted, we believe there is little risk of running out of water this year, but we could face a much more serious shortage next year – when it will be too late to catch up – if the current drought continues through the summer and fall.

A **Water Supply Advisory** represents an alert to our customers about the potential shortage and provides notice that additional water use restrictions may be imposed if supply/demand conditions do not improve in the near future. Year-round conservation requirements will remain in effect for all OWASA customers during the Advisory, but additional restrictions will be invoked if a Stage 1 Water Shortage is declared during the next few months.

We will be glad to provide additional information or assistance as needed.

Sincerely,

Michael A. (Mac) Clarke, Chair  
Board of Directors

#### attachments

- c: Mr. W. Calvin Horton, Chapel Hill Town Manager (w/attachments)  
Mr. John Link, Orange County Manager (w/attachments)  
Mr. Steven Stewart, Carrboro Town Manager (w/attachments)  
Ms. Nancy Sutenfield, Vice Chancellor for Finance & Administration (w/attachments)  
Ms. Carolyn W. Elfland, Associate Vice Chancellor for Campus Services (w/attachments)  
OWASA Board of Directors (w/attachments)  
Ed Kerwin, Executive Director (w/attachments)

**AGENDA ITEM**

- RECOMMENDED DECLARATION OF WATER SUPPLY ADVISORY

**PURPOSE**

- To consider the formal declaration of a Water Supply Advisory per OWASA Conservation Standards and local ordinances.

**BACKGROUND**

- Persistent conditions of severe drought in the North Carolina Piedmont and abnormally low streamflow in the tributaries to University Lake and the Cane Creek Reservoir support the declaration of a Water Supply Advisory per provisions of OWASA's Water Conservation Standards adopted in 2003 and incorporated into the ordinances of Carrboro, Chapel Hill, and Orange County.
- A Water Supply Advisory represents an alert to customers about a potential shortage and provides notice that additional water use restrictions may be imposed if supply/demand conditions do not improve in the near future. Year-round conservation requirements would remain in effect for all OWASA customers during the Advisory, but additional restrictions would be invoked if a Stage 1 Water Shortage is declared during the next few months.
- We believe there is little risk of running out of water this year, but we could face a much more serious shortage next year – when it will be too late to catch up – if the current drought continues through the summer and fall.

**ACTION NEEDED**

- Review and discussion of attached materials.

**STAFF RECOMMENDATION**

- Staff recommends that the Board declare a Water Supply Advisory and notify the Carrboro and Chapel Hill Mayors and Chair of the Orange County Board of Commissioners accordingly.

April 27, 2006

## **MEMORANDUM**

**TO:** Board of Directors  
**THROUGH:** Ed Kerwin  
**FROM:** Ed Holland  
**DATE:** April 20, 2006  
**SUBJECT:** Recommended Declaration of Water Supply Advisory

### **Background**

Following the record drought of 2002, the OWASA Board adopted new Water Conservation Standards that were incorporated into the local ordinances of Carrboro, Chapel Hill, and Orange County in 2003. All three ordinances specify water use restrictions that apply year-round, regardless of drought conditions, and additional restrictions that may be invoked under progressively more serious water supply risks designated as Stage 1, 2, 3, or Emergency Shortages. A one-page summary of the stages and restrictions is attached as Exhibit 1.

Per the ordinances, OWASA's determination of water shortage conditions is based on reservoir levels, streamflow, customer demand, availability of supplemental supplies, and other "elements of reasonable professional judgment." These determinations are guided by estimates of the probability that water stored in our reservoir system will decline to unacceptably low levels within the foreseeable future. A graphic presentation of the guide for these decisions is attached as Exhibit 2.

### **Water Supply Advisory**

OWASA's Conservation Standards and the corresponding local ordinances provide for a Water Supply Advisory as follows:

*A Water Supply Advisory shall represent an alert to the public of a potential shortage and notification that water use restrictions may be imposed if the water supply and/or demand conditions do not improve in the near future. In the event of a declared Water Supply Advisory:*

- 1. No mandatory water use restrictions other than year-round requirements already in place will be implemented.*
- 2. OWASA shall make extensive use of media releases, advertising, and other reasonable means of publicizing the water supply advisory and the need for immediate voluntary conservation.*
- 3. OWASA shall inform the Mayors of Carrboro and Chapel Hill and the Chair of the Orange*

*County Board of Commissioners of its declaration of a Water Supply Advisory.*

### **Recent Supply and Demand Conditions**

As of today, our reservoirs are slightly less than 90 percent full with 3.0 billion gallons of water in storage. At an average withdrawal rate of 9 million gallons per day (mgd), that represents about 11 months of use. At a rate of 11 mgd, it would last about 9 months. Our reservoirs were 75 percent full on April 20, 2002 during the record drought, but recent tributary streamflows are lower than they were at the same time during 2002. Due to the relatively large storage capacity of our system, there is little risk of running out of water this year, but we may face a more serious shortage next year – when it will be too late to catch up – if the current drought continues through the summer and fall.

As illustrated by the black-bordered cells in Exhibit 2, reservoir storage declined at a rate of 330 million gallons per month during the summer of 2002. If current storage declines at that same rate during the coming months, Stage 1 restrictions may be necessary as early as June. If reservoir storage more closely follows the drawdown trend of last summer (indicated by the blue-bordered cells), the risk level will likely fall in a risk range somewhere between Water Supply Advisory and Stage 1 levels.

The principal factors that will determine reservoir storage during the coming months are the weather (rainfall/streamflow and evaporation), and customer demand. The only factor over we can exercise any control is, of course, customer demand. Drought conditions are predicted to persist for the foreseeable future.

### **Staff Recommendation**

In view of the conditions described above, we believe it appropriate for the OWASA Board to declare a Water Supply Advisory and to notify the Carrboro and Chapel Hill Mayors and Chair of the Orange County Board of Commissioners accordingly. A draft letter is attached as Exhibit 3. Staff will prepare and disseminate appropriate media releases, public notices, and so forth.

A handwritten signature in black ink, appearing to read 'Ed Holland', is written over a horizontal line.

Edward A. Holland, AICP  
Planning Director

Attachments

# OWASA WATER CONSERVATION ORDINANCE SUMMARY (ADOPTED JUNE 2003)

Year Round Conservation	Water Supply Advisory	Stage One Shortage <i>10% reduction goal</i>	Stage Two Shortage <i>15% reduction goal</i>	Stage Three Shortage <i>20% reduction goal</i>	Water Supply Emergency <i>20+% reduction goal</i>
Spray Irrigation limited to 3 days/week, between 8 PM and 9 AM [Even Addresses: Sun, Wed, Fri; Odd Addresses: Tue, Thur, Sat] ~ All irrigation limited to 1 inch per week ~ Automatic controllers and moisture sensors required on all irrigation systems ~ Shut-off nozzles required on all hoses ~ Wasteful water use prohibited ~ Leaks must be repaired within 10 days ~ Use of reclaimed or harvested water strongly encouraged ~ Restaurants to serve water only on request ~ Hotels to change bed linens only on request ~ Dishwashers and clothes washers to be operated with full loads only ~ Use of water saving fixtures strongly encouraged	Public alert about potential shortage; notice that water use restrictions may be imposed in the near future ~ No mandatory water use restrictions other than year- round requirements already in place ~ Targeted conservation education and awareness campaign	Spray Irrigation limited to 1 day/ week, between 8 PM and 9 AM [Even Addresses: Tue; Odd Addresses: Thur] ~ All irrigation limited to ½ inch per week ~ Irrigation by underground, drip irrigation, soaker hoses, or hand - held hoses or watering cans may occur at any time or frequency, but limited to ½ inch per week ~ No OWASA water to refill ornamental fountains, ponds and like devices ~ No OWASA water for routine cleaning of paved surfaces such as sidewalks and roadways. Restrictions do not apply to pressure cleaning of exterior building surfaces ~ Water use by residential customers limited to 1,000 gallons per day	No Spray Irrigation, except by persons regularly engaged in the sale of plants ~ Irrigation by underground, drip emitters, soaker hoses, or hand- held hoses or watering cans may occur at any time or frequency, but limited to ½ inch per week ~ No OWASA water to refill ornamental fountains, ponds, etc. ~ No vehicle washing, except at commercial or institutional car washes in which 50% of water has been recycled ~ No OWASA water for filling or refilling empty swimming pools. Operating swimming pools may be topped off. ~ No OWASA water for cleaning or washing exterior building surfaces or paved areas. Pressure washing of buildings prior to painting is allowed ~ Residential use limited to 800 gallons per day	No irrigation, except with hand-held hoses or watering cans, limited to 3 days per week, no more than ½ inch per week ~ No outdoor use, except for emergency fire suppression or other activities necessary to maintain public health, safety or welfare ~ No OWASA water to refill ornamental fountains, ponds, etc. ~ No washing of vehicles ~ No pressure cleaning of building exteriors ~ No OWASA water for flushing or pressure testing new lines unless water is recycled ~ No filling, refilling, or topping off operating swimming pools ~ Water for heating and cooling to be reduced to the maximum extent allowable ~ Residential use limited to 600 gallons per day	No OWASA-supplied potable water for any outdoor purposes other than emergency fire suppression or other activities necessary to maintain public health, safety, or welfare ~ Water for heating and cooling to be reduced to the maximum extent allowable ~ Water service may be discontinued or reduced to designated users or in designated portions of the OWASA service area in order to preserve the availability of water for essential public health and safety requirements, such as fire protection, hospitals, clinics, and other critical community needs



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Chapel Hill, NC 27516

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OWASA Board of Directors  
Ed Kerwin, Executive Director

## Exhibit 2. Reservoir Drawdown Frequency and Guidelines for Conservation Triggers, Average Demand = 9.15 mgd

Number of times (or percent of years) during the 77-year streamflow record in which reservoir storage would have declined to 20% or less during the following 18 months.

		Jan 8.0 mgd	Feb 8.2 mgd	Mar 8.0 mgd	Apr 8.3 mgd	May 9.2 mgd	Jun 9.8 mgd	Jul 10.5 mgd	Aug 10.6 mgd	Sep 10.3 mgd	Oct 9.8 mgd	Nov 9.0 mgd	Dec 8.1 mgd
Water Remaining in University Lake and Cane Creek Reservoirs (% Full and Million Gallons)	100% 3358	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
	95% 3190	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
	90% 3022	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	1 1%	0 0%	0 0%	0 0%	0 0%
	85% 2854	0 0%	0 0%	0 0%	0 0%	2 3%	0 0%	0 0%	1 1%	0 0%	0 0%	0 0%	0 0%
	80% 2686	0 0%	0 0%	0 0%	0 0%	2 3%	3 4%	2 3%	1 1%	1 1%	0 0%	0 0%	0 0%
	75% 2519	0 0%	0 0%	0 0%	0 0%	2 3%	3 4%	2 3%	1 1%	1 1%	0 0%	0 0%	0 0%
	70% 2351	0 0%	0 0%	0 0%	0 0%	2 3%	3 4%	3 4%	3 4%	1 1%	1 1%	0 0%	0 0%
	65% 2183	0 0%	0 0%	0 0%	2 3%	4 5%	4 5%	4 5%	3 4%	1 1%	1 1%	0 0%	0 0%
	60% 2015	0 0%	0 0%	1 1%	4 5%	6 8%	10 13%	6 8%	5 6%	3 4%	1 1%	1 1%	0 0%
	55% 1847	0 0%	1 1%	2 3%	4 5%	13 17%	12 16%	12 16%	7 9%	3 4%	2 3%	1 1%	0 0%
	50% 1679	0 0%	1 1%	2 3%	6 8%	15 19%	18 23%	16 21%	9 12%	6 8%	3 4%	1 1%	1 1%
	45% 1511	1 1%	1 1%	3 4%	7 9%	17 22%	21 27%	22 29%	17 22%	8 10%	3 4%	2 3%	1 1%
	40% 1343	1 1%	1 1%	3 4%	8 10%	24 31%	29 38%	26 34%	25 32%	18 23%	5 6%	3 4%	1 1%
	35% 1175	1 1%	3 4%	5 6%	12 16%	25 32%	34 44%	34 44%	31 40%	27 35%	15 19%	3 4%	2 3%
	30% 1007	1 1%	4 5%	6 8%	14 18%	27 35%	38 49%	39 51%	39 51%	40 52%	25 32%	7 9%	3 4%
	25% 839	3 4%	4 5%	6 8%	17 22%	33 43%	45 58%	48 62%	46 60%	50 65%	40 52%	19 25%	5 6%

**Conservation Stages and Risk Levels**

NORM	ADV	#1	#2	#3	EMRG
0-1%	1-3%	3-8%	8-21%	21-47%	48+%

**2002 Reservoir Levels**

**2005 Reservoir Levels**

**2006 Reservoir Levels**

Each cell of the table contains an integer and a percentage, which represent the probability that reservoir levels will decline to 20 percent or less of full capacity during the following 18 months. These were calculated from spreadsheet model runs of 77+ years of daily streamflow data, updated through January 2003, and driven by monthly water demand and reservoir storage at the beginning of each month. Calculations were based on an average annual raw water demand of 9.15 mgd, adjusted by observed monthly ratios, which are reflected in monthly demands shown at the top of the table.

Each row of the table corresponds to a month, and each column corresponds to reservoir storage at the beginning of that month. Storage is subdivided into increments of 5% and also expressed as million gallons (MG).

Colors indicate the corresponding conservation and risk levels proposed for each condition. Cells highlighted in **black** or **blue** represent actual reservoir storage conditions at the beginning of that month during the **severe drought year of 2002 (black)**, **last year 2005 (blue)**, or **the current year (orange)**. The storage level indicated for May 2006 has been estimated from conditions as of April 20, 2006.

Rev 4/20/06

## OWASA Water Supply Conditions, April 26, 2006 A Tale of Two Aprils

	April 26, 2002	April 26, 2006
<b>Water in Reservoirs</b>	<b>2.48 BG (74% Full)</b>	<b>3.02 BG (90% Full)</b>
<b>Previous Date When Reservoirs Were 100% Full</b>	<b>June 10, 2001</b>	<b>June 6, 2005</b>
<b>Days Since Reservoirs Were Last Full</b>	<b>326 days</b>	<b>322 days</b>
<b>Rainfall Since Previous June 1 (30-year average for June through April is 43.5 inches)</b>	<b>33.2 inches (76%)</b>	<b>34.2 inches (79%)</b>
<b>Average Inflow Since Reservoirs Were Last Full</b>	<b>8.1 mgd</b>	<b>6.8 mgd</b>
<b>Average Water Withdrawals Since Reservoirs Were Last Full</b>	<b>10.1 mgd</b>	<b>8.7 mgd</b>
<b>Average Treated Water Demand Since Reservoirs Were Last Full</b>	<b>9.4 mgd</b>	<b>8.7 mgd</b>
<b>Average Volume of Process Water Recycled Since Reservoirs Were Last Full</b>	<b>0</b>	<b>0.65 mgd</b>

BG = billion gallons; mgd = million gallons per day

### Observations:

- Reservoir storage and rainfall deficits at the end of April 2006 are similar to those observed at the end of April during the severe drought year of 2002.



- Reservoir inflows since June 2005 have been less than the same period during the 2001-2002 drought.
- OWASA has withdrawn 1.4 mgd (13 percent) less water from our reservoirs since June 2005 than we withdrew during the same period during the 2001-2002 drought. This represents 450 million gallons ( $322 \text{ days} \times 1.4 \text{ mgd} = 450 \text{ million gallons} = 0.45 \text{ BG}$ ) that was not withdrawn during the past 11 months. This is equivalent to the entire storage volume of University Lake.
- Approximately half (0.65 mgd) of this reduction was achieved by recycling “process water” at OWASA’s Jones Ferry Road Water Treatment Plant. The other half of the reduction has been due to decreased customer demand since 2002.
- Despite four years of steady growth and development in the residential, commercial, and University sectors of our customer base, overall demand for water during the past 11 months has been 0.7 mgd less than it was during the same period four years ago.
- If water had been withdrawn from our reservoirs during the past 11 months at the same rate that it was withdrawn during the same period of 2001-2002, today’s storage levels (~90 percent full) would be very close to the 75 percent levels of April 2002. We have nearly two months more water in storage today than we had at the end of April 2002.
- It is important that all OWASA customers continue the degree of responsible water use and conservation that have resulted in these significantly better supply water conditions.