

LOWER CAPE FEAR WATER & SEWER AUTHORITY

**KINGS BLUFF RAW WATER
SYSTEM**

**RAW WATER SUPPLY EMERGENCY
MANAGEMENT PLAN**



ADOPTED March 9, 2020

LCFWSA Kings Bluff Raw Water System Raw Water Supply Emergency Management Plan

I. Background

The Lower Cape Fear Water and Sewer Authority is a regional organization comprised of several governmental entities including Bladen, Brunswick, Columbus, New Hanover, and Pender Counties, and the City of Wilmington. The Authority was created to aid development of a water supply system for the sponsoring member governments, which are primarily located in southeastern North Carolina. The Authority's current facilities consist of the following:

- Two (2) Raw Water Intake Pipes and Associated Intake Screens
- Kings Bluff Raw Water Pumping Station
- Interim Booster Pumping Station
- Raw Water Transmission Main Piping
- Raw Water Storage Reservoir
- Two- Diesel Powered Standby Generators
- One Low-Duty Diesel Powered Generator
- Transmission Main Pigging Facilities
- Air Surge Tank System

The Authority obtains raw water from the Cape Fear River via two (2) raw water intake pipes (48-inch and 60-inch diameter) located just above Lock & Dam No. 1 in Bladen County. Raw water is conveyed by various raw water transmission mains to several governmental and industrial users in the region. The Authority's current customers are as follows:

- Brunswick County (governmental entity)
- Cape Fear Public Utility Authority (CFPUA - governmental entity)
- Pender County (governmental entity)
- Invista (private industry)
- Praxair Incorporated (private industry)

II. Purpose

The purpose of this document is to establish a Water Supply Emergency Management Plan and develop a protocol or water shortage response planning/reporting during droughts, water emergencies, or other potential raw water supply challenges.

III. Potential Raw Water Supply Reduction Scenarios

Kings Bluff Raw Water Pumping Station is responsible for providing raw water supply to its current customers. Situations that could impact the availability of raw water supply are as follows:

A. Raw Water Supply Shortage

1. Contamination in Cape Fear River – If a contaminant is introduced to the river upstream from the intakes, it could be considered an emergency and necessitate a reduction or elimination in customer withdrawal. The extent of contamination and number of days for contamination to arrive and pass before raw water can be withdrawn will need to be determined. Situational information will be a necessary part of the decision process on when the system could be placed back in operation.
2. Drought conditions – Mild, moderate, or severe drought conditions may reduce the available withdrawal from the Cape Fear River. Low river levels will impact the ability of the intake screens to convey water to the Kings Bluff Raw Water Pump Station and ultimately to customers.
3. US Army Corps of Engineers – Jordan Lake Release - The current Jordan Lake management plan from USACOE requires a low flow augmentation pool for release from the dam to the Cape Fear River. If the Jordan Lake level is reduced, subsequent releases from the river may be reduced resulting in lower river levels. Low river levels will impact the ability of the intake screens to convey water to the Kings Bluff Raw Water Pump Station and ultimately to customers.
4. Customer Demand – If customer demand exceeds the available capacity from the Kings Bluff Raw Water System, a reduction in available raw water supply may occur.

B. Complete/Significant Loss of Water Supply

1. Pump Station Outage - Unable to operate Pump Station due to service outage (loss of power, equipment failure, storm, flood, etc.)
2. Pipeline Failure - Failure of raw water pipeline (major leak, rupture, other interruption of flow through pipe)
3. Ground Storage Tank Failure - Failure of 3 MG ground storage tank (breach of tank results in loss of pressure to supply customers)
4. Extreme Drought – if water level drops below intake screens, raw water cannot be withdrawn from the river.

IV. Emergency Management Matrix

The following potential water conservation scenarios have been identified and the appropriate conservation stage provided. Note that the conservation stage identified may be modified at the Executive Director's discretion to optimize raw water supply and system operation. For detailed information regarding conservation measures, refer to Section V of this document.

Scenario	Potential Impact	Water Emergency/Conservation Advisory Stage
Drought Conditions	Low flow in river limiting withdrawal. Reduced available raw water supply	<ul style="list-style-type: none"> • Mild: Stage 0 or 1 • Moderate: Stage 1 or 2 • Severe: Stage 3 or 4 • Extreme: 4
Scenario	Potential Impact	Water Emergency/Conservation Advisory Stage
US Army Corps of Engineers Jordan Lake Reduction in Dam Release	Low flow in river limiting withdrawal. Reduced available raw water supply	<ul style="list-style-type: none"> • Mild: Stage 0 or 1 • Moderate: Stage 1 or 2 • Severe: Stage 3 or 4
Scenario	Potential Impact	Water Emergency/Conservation Advisory Stage
Customer demand exceeds available capacity from the Kings Bluff system	Reduced available raw water supply	<ul style="list-style-type: none"> • Varies – See Water Emergency Conservation Advisory Stage Table (Section V of this document)
Scenario	Potential Impact	Water Emergency/Conservation Advisory Stage
Contamination in Cape Fear River	Water supply interruption until the contaminant passes	<ul style="list-style-type: none"> • Stage 4
Scenario	Potential Impact	Water Emergency/Conservation Advisory Stage
Pipeline Failure (major leak, rupture, etc.)	Disruption in raw water supply to customers	<ul style="list-style-type: none"> • Stage 4

Scenario	Potential Impact	Water Emergency/Conservation Advisory Stage
Pump Station Service Outage (loss of power, equipment failure, storm, flood, etc.)	Disruption in raw water supply to customers	<ul style="list-style-type: none"> Stage 4
Scenario	Potential Impact	Water Emergency/Conservation Advisory Stage
Failure of 3 MG Ground Storage Tank	Disruption in raw water supply to customers	<ul style="list-style-type: none"> Stage 4

V. Water Emergency/Conservation Advisory Stages

The following Water Emergency/Conservation Stages has been developed to include “Triggers” based on system capacity and identified “Action Items” to effect reductions in raw water demand.

Operating Stage 0 – Voluntary Resource Management Stage	
Trigger	Action Items
5 Consecutive Days Demand > 85% of Available System Capacity	<ul style="list-style-type: none"> No public notification will be made Notify utility customers that the trigger has been reached. Identify voluntary customer actions to reduce demand on system and avoid further restrictive stages.
Operating Stage 1 – Dedicated Resource Management Stage	
Trigger	Action Items
Stage 0 does not result in substantial demand reduction within 5 days or demand continues at or above 85% of Available System Capacity	<ul style="list-style-type: none"> No public notifications will be made Conduct customer meeting to evaluate current and projected demands Each customer will identify and commit to measures to reduce demand based on the ability of the system: <p style="text-align: center;"><u>Potential Customer Measures</u></p> <p>CFPUA</p> <ul style="list-style-type: none"> Shift customers from Sweeney Water Treatment Plant to Richardson System Supplement with emergency well systems Utilize/Maximize CFPUA Kings Bluff Raw Water System

	<p>Brunswick County</p> <ul style="list-style-type: none"> ○ Utilize interconnections/supply from the NC 211 Groundwater Plant ○ Utilize interconnections with Little River Water & Sewage Company <p>Pender County</p> <ul style="list-style-type: none"> ○ Utilize interconnections/supply Town of Wallace ○ Utilize Hampstead/Scotts Hill Wells (proposed/under design) ○ Utilize interconnections with Surf City's System <p><u>It is noted that "Potential Customer Measures" identified under this stage involving other utilities, will be dependent upon the ability of the utility to provide additional water.</u></p>
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Operating Stage 2 – Mandatory Restrictions (Non-Critical Use)

Trigger	Action Items
<p>3 Consecutive Days Demand > 90% of Available System Capacity</p>	<ul style="list-style-type: none"> ● LCFWSA will issue formal notifications of the Water Conservation Stage to Customers <p>LCFWSA would require that customers implement the following measures at a minimum:</p> <ul style="list-style-type: none"> ● Automatic & non-automatic spray irrigation systems: <ul style="list-style-type: none"> ○ May only operate between 12:00 AM – 6:00 AM ○ Even addresses may irrigate on: Wednesday/Friday/Sunday ○ Odd addresses may irrigate on: Tuesday/Thursday/Saturday ● Hose end Sprinklers: <ul style="list-style-type: none"> ○ May only operate between 6:00 AM-10:00 AM and 6:00 PM-10:00 PM ○ Even addresses may irrigate on: Wednesday/Friday/Sunday ○ Odd addresses may irrigate on: Tuesday/Thursday/Saturday ● No pool filling allowed (only routine topping off allowed as necessary to maintain structural integrity and filtration system). ● No use of water from hydrants allowed except for fire-fighting/protection except for flushing to protect public

	<p>health and safety, as needed.</p> <ul style="list-style-type: none"> • Approved large commercial, industrial, institutional irrigation systems, Golf Courses must adhere to the following: <ul style="list-style-type: none"> ○ 10% target reduction on irrigation use from the previous month • A permit will be required for landscape contractors to establish new landscapes • Commercial and industrial water customers directly served by LCFWSA shall achieve mandatory reductions in water usage through whatever means are available. A minimum reduction of twenty (20) percent shall be the target, however a greater target reduction percentage may be required depending on the severity of the water shortage emergency. Compliance with the reduction target shall be determined by the LCFWSA Executive Director or his authorized representative. Variances to the target reduction may be granted by Executive Director or his authorized representative to designated public health facilities.
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Operating Stage 3 – Mandatory Restrictions (Most Restrictive)

Trigger	Action Items
<p>Stage 2 does not result in substantial demand reduction within 5 days or demand continues at or above 90% of Available System Capacity</p>	<ul style="list-style-type: none"> • LCFWSA will issue formal notifications of the Water Conservation Stage to Customers • Customers must continue actions from all previous stages. • Invista & Praxair will be contacted to identify measures to reduce demand. <p><u>LCFWSA would require that customers implement the following measures at a minimum:</u></p> <p>The following shall be prohibited:</p> <ul style="list-style-type: none"> • Use of automatic & non-automatic spray irrigation systems • Use of hose end sprinklers • Irrigation or cleaning using hand held hose • Drip Irrigation • Pressure washing (residential) • Vehicle washing (residential) • Fountains, Artificial waterfalls, misting machines, reflecting pools, ornamental ponds except for minimum

	<p>amount of water necessary to maintain aquatic life.</p> <ul style="list-style-type: none"> • Approved large commercial, industrial, institutional irrigation systems, Golf Courses must adhere to the following: • 50% target reduction on irrigation use from the previous month • A written reduction plan must be submitted and approved prior to use • No new lawn/landscape establishment permits will be issued. • Commercial vehicle washes that do not recycle water must reduce total water consumption by 20% below the amount used from the previous month to continue operating. • Using the minimal amount of water to clean construction, emergency, transport, or public transportation vehicles is allowed if required to preserve functionality and safe operation as required by law. • Commercial and industrial water customers directly served by LCFWSA shall achieve mandatory reductions in water usage through whatever means are available. A minimum reduction of twenty (20) percent shall be the target, however a greater target reduction percentage may be required depending on the severity of the water shortage emergency. Compliance with the reduction target shall be determined by the LCFWSA Executive Director or his authorized representative. Variances to the target reduction may be granted by Executive Director or his authorized representative to designated public health facilities.
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Operating Stage 4 – Service Interruptions (Non-Demand Dependent)

Trigger	Action Items
<p>Interruption of service from the Kings Bluff system.</p> <ul style="list-style-type: none"> • Pipeline leak or failure • Mechanical, electrical, or other failures at Kings Bluff pump station • Mechanical, electrical, or other failures at the intermediate booster pump 	<ul style="list-style-type: none"> • LCFWSA will issue formal notifications of the Water Conservation Stage to Customers • Customers will be notified directly via email, phone, or other available resources. • Customers will enact mandatory measures as per individual conservation plans to the highest restrictive level. • Customers will manage resources utilizing interconnections, alternate sources, or other available methods to reduce raw water demand.

<p>station</p> <ul style="list-style-type: none"> • Ground tank failure or loss of service • Contamination in river • Low River Level (unable to withdraw water) 	<ul style="list-style-type: none"> • LCFWSA will evaluate and coordinate with NCDEQ and the US Army Corps of Engineers to utilize the emergency connection located on the DAK Industries site to obtain water from the river (if permissible). • Contamination in River: LCFWSA will evaluate contamination conditions and will cease operations until such time that the contamination has passed the Kings Bluff intakes. • Mechanical or Other Failures: LCFWSA will proceed expeditiously to repair identified issues and to place the system back in operation, either full or partial. • Low River Level: LCFWSA will consult with NCDEQ and the US Army Corps of Engineers for steps necessary to increase flow in river via release from Jordan Lake other available measures.
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Clarifications, Provisions and Exceptions

- 1) The action triggers shown are based on a available system capacity. Currently, the available system capacity is 43 MGD. Exceedance of the capacity triggers will be based on the summation of the individual customer meters.
- 2) Conservation Stages will be implemented as is reasonable and prudent based on system conditions. For example, the July 4th holiday is historically a high-water demand month. At the discretion of the Executive Director, the conservation stages identified may not be implemented during this holiday period or similar known high demand events.
- 3) For Stage 4: If a failure of the system (i.e., loss of ground tank, pipeline failure, failure of intermediate booster pump station) occurs downstream of any customer, then conservation measures may only be required of the customers downstream of the failure. Customers upstream of such a failure, may be allowed to continue to operate without conservation measures, unless such operation negatively impacts downstream customers or utilities. The Executive Director will have sole discretion to determine if a customer(s) can maintain current operations under such conditions. The Executive Director will communicate this decision to all customers.

VI. Notifications

The LCFWSA will be responsible for notifications direct to customers of the water conservation stage as appropriate. Notifications will be made for each stage as follows:

Stage	Direct Customer Notification
0 – Voluntary Resource Management Stage	Yes
1 - Dedicated Resource Management Stage	Yes
2 – Mandatory Restrictions (Non-Critical)	Yes
3 - Mandatory Restrictions (Most Restrictive)	Yes
4 – Service Interruptions (Non-Demand Dependent)	Yes

Direct Customer Notifications

The LCFWSA will directly notify all customers of the appropriate conservation stage. Contacts for each customer are provided as follows:

VII. Customer Contact Information

Brunswick County O&M Staff

- John Nichols, PE, Director, Public Utilities
john.nichols@brunswickcountync.gov
Office: 910-253-2653

- Glenn Walker, Water Resources Manager
glenn.walker@brunswickcountync.gov
Cell: 910-371-3490

- Jack Hogan, Kings Bluff Raw Water System Operations
Jack.Hogan@brunswickcountync.gov
Cell: 910-508-9071

Cape Fear Public Utility Authority

- Frank Styers, PE, Director, Linear Assets PM
frank.styers@cfpua.org
office: 910-332-6670

- Carel Vandermeijden, PE, Director, Treatment/Engineering Services
carel.vandermeijden@cfpua.org
office: 910-332-6654

- John Malone, Water Resources Manager
John.Malone@cfpua.org
Office: 910-332-6643
Cell: 910-515-6143

Pender County

- Kenny Keel, PE, Director, Public Utilities & Solid Waste
kkeel@pendercountync.gov
Office: 910-259-0212
Cell: 919-616-1034
- Anthony Colon, Assistant Director, Public Utilities & Solid Waste
acolon@pendercountync.gov
Office: (910) 259-1521
Cell: 910-389-3329
- James Proctor, Water & Sewer Superintendent
jproctor@pendercountync.gov
Office: (910) 259-1327

Invista

- Phillip E. Cline, Plant Manager
Phillip.Cline@invista.com
Office: (910) 341-3194
Mobile: (910) 398-4248
- Elizabeth Meyer
Elizabeth.Meyer@invista.com
Office: (910) 341-5515
Mobile: (910) 547-7080

Praxair

- Timothy Volk
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Cell: 734-693-7697
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