Cape Fear River Water Supply Evaluation

December 28, 2015

Department of Environmental Quality
Division of Water Resources

Cape Fear River Water Supply

Todays goal:

- **Review the Draft Cape Fear River Water Supply Evaluation**
- **Review the Draft Jordan Lake Water Supply Allocation Recommendations**
- **Ask for OK to make both documents public and take comments**

Proposed follow-up:

- **Announce availability of documents and comment period**
- **Hold a public meeting to discuss the documents and receive comments**
- **Compile and respond to comments**
- **Prepare final documents for presentation to EMC later this year**

Cape Fear River Water Supply Evaluation

Focuses on the Deep River, Haw River and Cape Fear River Subbasins

Also includes the Neuse River and Contentnea Creek Subbasins

Modeling includes:

- Surface water withdrawers
- Wastewater discharges
- 2010 and estimated future water demands
- 81 years of flow conditions from January 1930 to September 2011
- Flow record adjusted for historic withdrawals and discharges and construction of facilities affecting water management
- Reservoir management protocols
- Water Shortage/Drought Response protocols
- Purchase and sales arrangements

Analyzed 2060 estimated demands using the

Cape Fear – Neuse Rivers Hydrologic Model

Cape Fear River Water Supply Evaluation

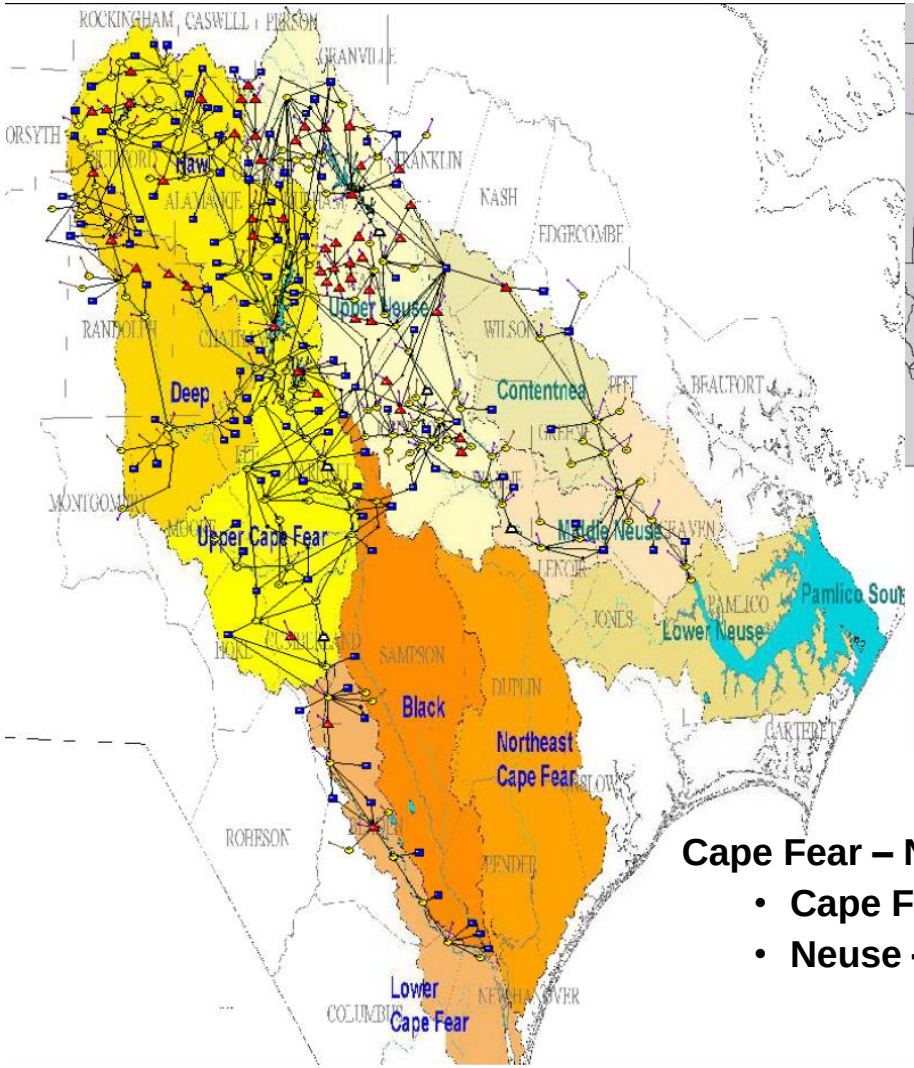
- **Analyzes the ability of surface water withdrawers to meet their estimated 2060 water demands over the range of flow that occurred from 1930 to 2011**
- **Identifies the magnitude and duration of potential supply shortages**
- **Estimates the potential yield of the Jordan Lake water supply pool under various water use options**
- **Presents the changes in flow and water quantity conditions for future demand withdrawals under a variety of water supply options**
- **Provides the background for the analysis used to develop allocation recommendation for the Jordan Lake water supply pool**

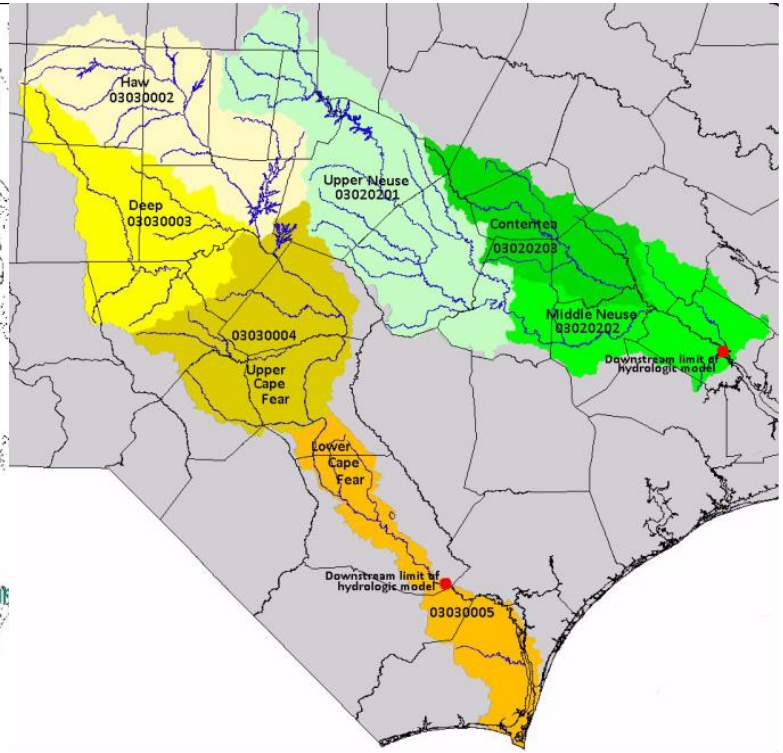
Cape Fear – Neuse River Basins Hydrologic Model

- **Computer based mathematical model customized for Deep River, Haw River, Cape Fear River, Neuse River and Contentnea Creek Subbasins**

- **Calculates surface water quantity impacts of withdrawals and returns**
- **Does not**:
  - model water quality
  - include flood analysis
  - reserve water to protect ecological integrity
  - predict future hydrologic conditions
  - include tidally influenced river reaches
- **2010 water demands, sources and management = starting point**
- **Future population and demand estimates from local officials**
- **Future wastewater same percent of withdrawal as 2010**
- **Wastewater discharges to continue at current locations**
- **Agricultural use based on crop acreage and livestock counts**
- **Evaluates ability to meet future demands over the range of flows 1930-2011**

Geographic Scope of Model and Evaluation





Cape Fear – Neuse River Basins Hydrologic Model

- **Cape Fear – 27 SW withdrawals > 82 water systems**
- **Neuse – 13 SW withdrawals > 36 water systems**

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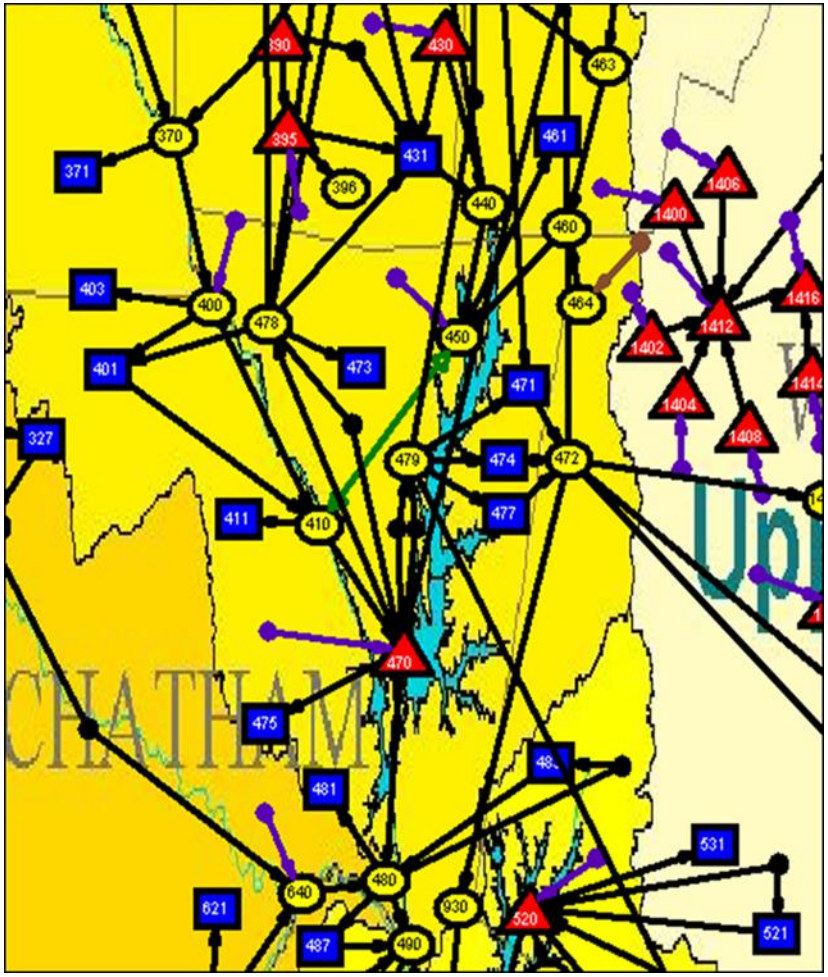
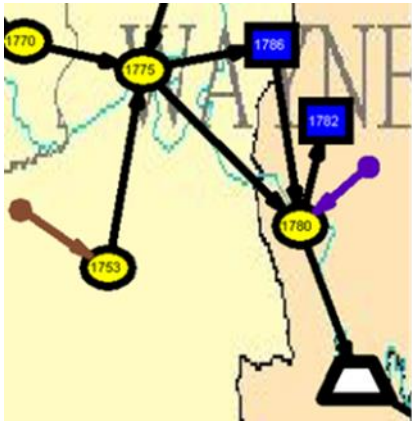
Model Schematic Detail





- Blue Square = Demand Node
- Red Triangle = Reservoir Node
- Yellow Oval = Junction Node
- Black Arc = Water Flow
- Brown Arc = Wastewater Inflow
- Purple Arc = Watershed Inflow
- White Trapezoid = Routing Node

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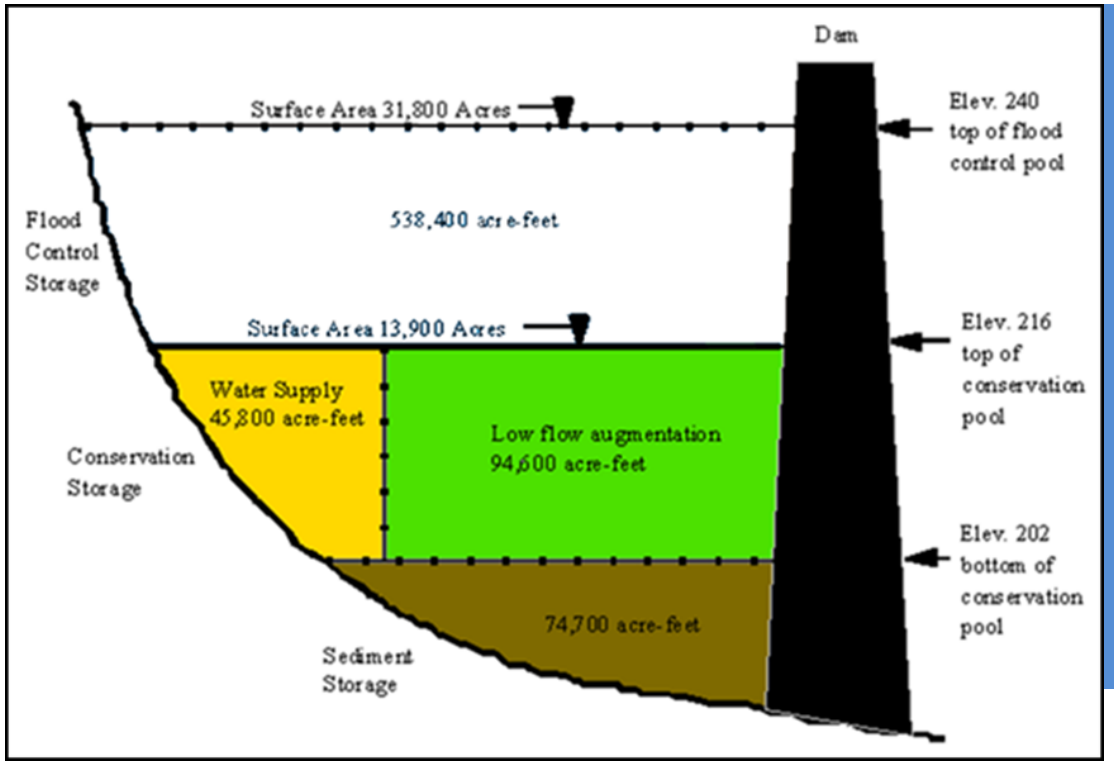
Jordan Lake Storage
Divided into 4 separate accounts

Flood Control - manage downstream flows during high precipitation events

Water Supply – allocated by EMC

Water Quality – maintain downstream flows for water quality

Sediment Storage – compensation for storage loss due to sedimentation



Flood Storage

216-240 ft-msl

Water Supply 32.62%

202-216 ft-msl

Water Quality 67.38%

202-216 ft-msl

Sediment Storage

>202 ft-msl

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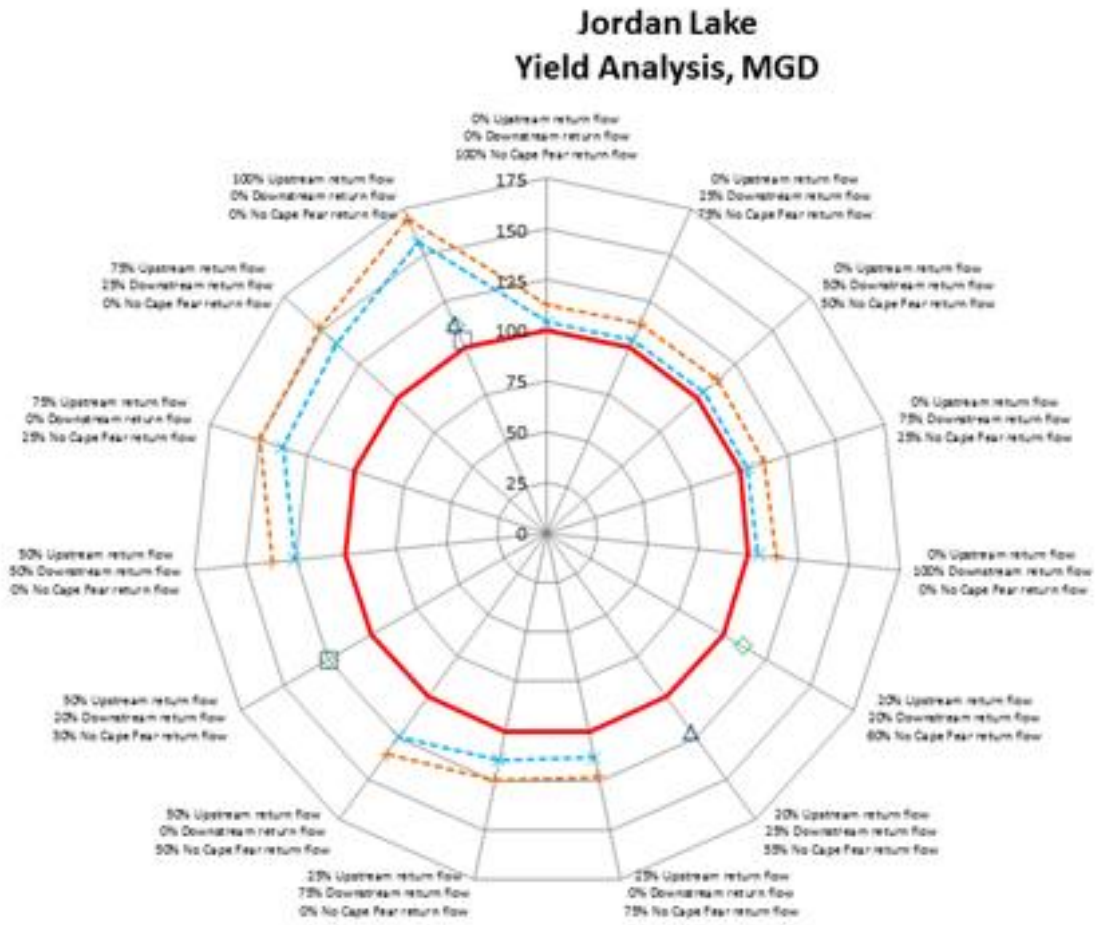
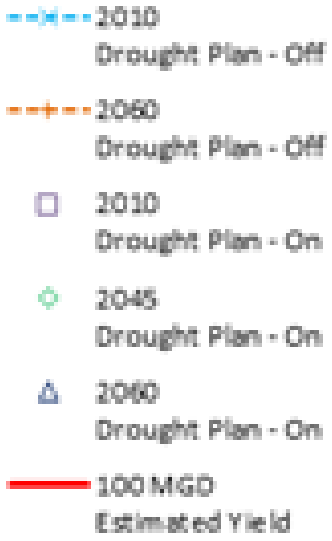
Jordan Lake Water Supply Yield

Based on modeling 100 mgd is a reliable estimate





- Center of graph = 0 mgd
- Outer ring = 175 mgd
- Red ring = 100 mgd
- All estimates > 100 mgd

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Potential Jordan Lake Water Supply Pool Yield

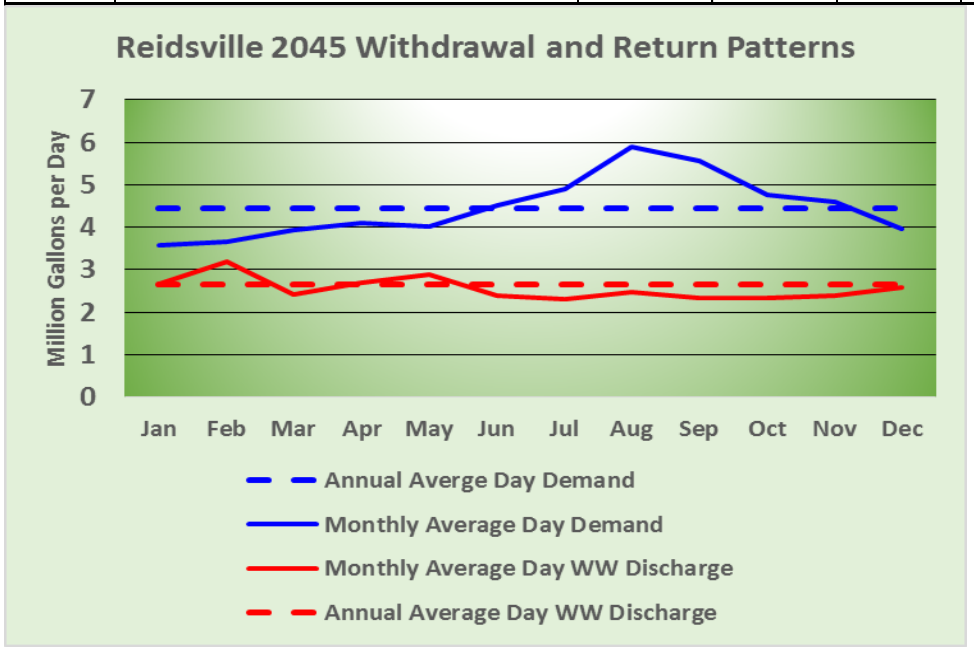
Estimated Jordan Lake Water Supply Yield									
Model Set Up	Return Flow Assumption			2010 Basecase Scenario			2060 Demand Scenario		
	%on Watershed	% Below Dam	%Out of Basin	Estimated Water Supply Yield (MGD)	Jordan Lake Minimum Elevation (ft-msl)	Minimum Water Supply Storage (%) 2/24/1934	Estimated Water Supply Yield (MGD)	Jordan Lake Minimum Elevation (ft-msl)	Minimum Water Supply Storage (%) 2/24/1934
1	0	0	100	104.06	202.65	0.65	112.92	203.03	0.79
2	100	0	0	156.94	204.30	1.07	169.66	204.06	1.18
3	0	100	0	104.98	203.55	0.74	113.84	203.36	1.60
4	50	50	0	125.44	203.88	2.69	136.69	203.67	0.96
5	50	0	50	124.19	202.69	0.86	134.86	203.07	0.87
6	0	50	50	104.00	202.65	0.71	112.92	203.03	0.73
7	25	75	0	114.63	203.70	1.17	124.81	203.50	0.81
8	25	0	75	113.25	202.67	0.73	122.91	203.05	0.85
9	75	25	0	140.31	204.07	0.95	151.45	203.86	0.97
10	0	25	75	103.99	202.65	0.75	112.92	203.03	0.77
11	75	0	25	137.56	202.71	0.89	149.55	203.04	1.02
12	0	75	25	104.00	202.65	0.70	112.92	203.03	0.71

Potential Jordan Lake Water Quality Pool Status

Estimated Minimum Water Quality Pool Storage									
Model Set Up	Return Flow Assumption			2010 Basecase Scenario			2060 Demand Scenario		
	%on Watershed	% Below Dam	%Out of Basin	Minimum Water Quality Storage (%)	Date of Minimum Water Quality Storage	Number Days Water Quality = 0	Minimum Water Quality Storage (%)	Date of Minimum Water Quality Storage	Number Days Water Quality = 0
1	0	0	100	0.02	8/ 22/ 2002	0	0.00	8/ 9/ 2002	10
2	100	0	0	14.04	11/ 30/ 1953	0	9.94	2/ 24/ 1934	0
3	0	100	0	9.15	2/ 24/ 1934	0	4.08	2/ 24/ 1934	0
4	50	50	0	11.94	2/ 24/ 1934	0	7.03	2/ 24/ 1934	0
5	50	0	50	0.21	10/ 20/ 2007	0	0.11	8/ 22/ 2002	0
6	0	50	50	0.08	10/ 23/ 2007	0	0.00	8/ 21/ 2002	4
7	25	75	0	10.75	2/ 24/ 1934	0	5.99	2/ 24/ 1934	0
8	25	0	75	0.08	8/ 22/ 2002	0	0.03	8/ 22/ 2002	0
9	75	25	0	13.63	11/ 30/ 1953	0	8.43	2/ 24/ 1934	0
10	0	25	75	0.02	8/ 24/ 2002	0	0.00	8/ 14/ 2002	7
11	75	0	25	0.35	12/ 11/ 2007	0	0.26	8/ 29/ 2002	0
12	0	75	25	0.12	12/ 13/ 2007	0	0.08	12/ 11/ 2007	0

Withdrawals and Return Flows

Modeled Annual Average Surface Water Withdrawals and Return Flows in Million Gallons per Day (MGD)							
Model Node	Surface Water Withdrawer	Wastewater Proportion	2010 Current Conditions	2035 Estimated Demand	2045 Estimated Demand	2060 Estimated Demand	Estimate Type
31	Reidsville Demand_02-79-020		3.530	4.347	4.459	4.666	Demand
	Reidsville nc0046345 and nc0024881	0.594	2.097	2.582	2.649	2.772	WW Return
123	Greensboro Total Demand_02-41-010		35.240	48.485	55.312	67.399	Demand
	Lake Townsend nc0081671	0.132	4.652	6.400	7.301	8.897	WW Return
	North Buffalo Creek nc0024325	0.283	9.973	13.721	15.653	19.074	WW Return
	Ozborne nc0047384	0.737	25.972	35.733	40.765	49.673	WW Return
	Mitchell nc0081426	0.02	0.705	0.970	1.106	1.348	WW Return



- **Each water withdrawal is characterized by an individualized withdrawal and return flow pattern**
- **Municipal demand patterns vary by month**
- **Agricultural withdrawals vary by time of the year and precipitation**

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Jordan Lake Conditions

Jordan Lake Water Level and Water Supply Storage Summary							
	Water Level		Water Supply Pool Critical Period (<100%)				
Model Scenario	Minimum ft msl	Date	Minimum Storage %	Dates	# Days	Longest Period <100%	# Days
2010 Simbase_Current	209.7	8/30/2002	91	7/9/1953 - 12/9/1953	154	7/9/1953 - 12/9/1953	154
01_JLA_LWSP_Dem2060	207.7	10/23/2007	36	7/6/1953 - 1/15/1954	194	5/17/1933 - 3/5/1934	293
02_JLA_Req2045_Dem2060	207.6	12/1/1953	33	7/6/1953 - 1/15/1954	194	5/17/1933 - 3/5/1934	293
03_JLA_F_Req2045_Dem2060	207.2	12/1/1953	26	5/17/1933 - 3/6/1934	294	5/17/1933 - 3/6/1934	294

Jordan Lake Water Quality Storage and Target Flow Summary						
	Water Quality Pool (Flow Augmentation Pool)		Lilington Low-Flow **			
Model Scenario	Minimum Storage %	Date	Min. daily avg. cfs	Date	# years 1 or more days <600 cfs	# days <600 cfs *
2010 Simbase_Current	21	8/30/2002	285	10/1/2007	61	4,274
01_JLA_LWSP_Dem2060	29	10/23/2007	152	8/19/2002	66	5,107
02_JLA_Req2045_Dem2060	30	10/23/2007	158	8/19/2002	66	5,071
03_JLA_F_Req2045_Dem2060	30	10/23/2007	156	8/19/2002	66	5,108

Water Supply Shortage Analysis

Appendix C Summary of Water System Supply Shortages Under Various Model Scenarios													
Cape Fear River Basin													
		Model Scenarios											
Model Node Number	Water System / Shortage Measure	01_JIA_LWSP_Dem2035	01_JIA_LWSP_Dem2045	01_JIA_LWSP_Dem2060	02_JIA_Req2045_Dem2035	02_JIA_Req2045_Dem2045	02_JIA_Req2045_Dem2060	03_JIA_F_Req2045_Dem2035	03_JIA_F_Req2045_Dem2045	03_JIA_F_Req2045_Dem2060	04_JIA_Raleigh_Ullington_Dem2045	Simbase-current	Simbase_Dem2045
0431	Orange Water & Sewer Authority	With Water Shortage Response Plan											
	Max Shortage, mgd / Max shortage Period, days	0	0	0	0	0	0	0	0	0	0	0	5.6/22
	Longest Avg Shortage, mgd / Longest Shortage Period, Days	0	0	0	0	0	0	0	0	0	0	0	5.2/22
	Total Days Short	0	0	0	0	0	0	0	0	0	0	0	22
0471	Cary Apex	With Water Shortage Response Plan											
	Max Shortage, mgd / Max shortage Period, days	0	0	0	0	0	0	0	0	0	0	0	0
	Longest Avg Shortage, mgd / Longest Shortage Period, Days	0	0	0	0	0	0	0	0	0	0	0	0
0473	Chatham County-North	With Water Shortage Response Plan											
	Max Shortage, mgd / Max shortage Period, days	0	0	0	0	0	12.4/1	0	0	16.9/1	0	0	12.5/24
	Longest Avg Shortage, mgd / Longest Shortage Period, Days	0	0	0	0	0	8.9/3	0	0	4.97/33	0	0	10.21/24
	Total Days Short	0	0	0	0	0	3	0	0	152	0	0	136

- Potential Water Supply Shortages were analyzed for each water withdrawer under each of the model scenarios evaluated.

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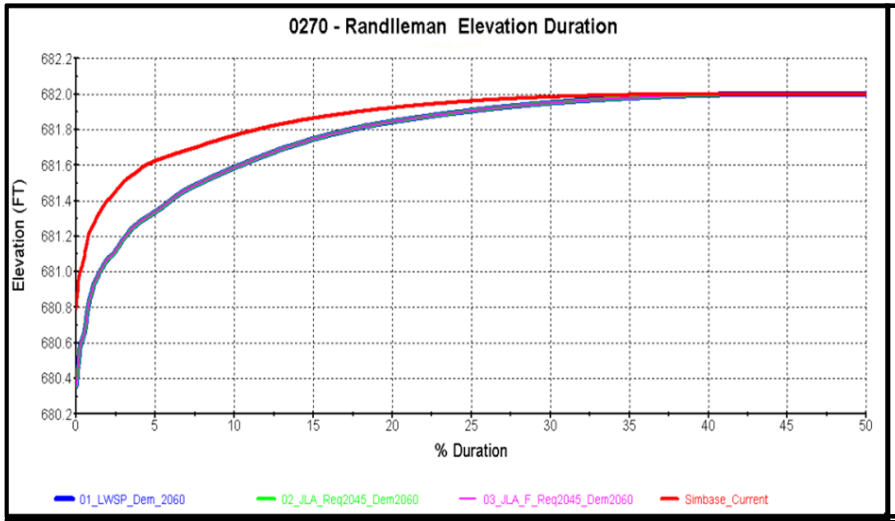
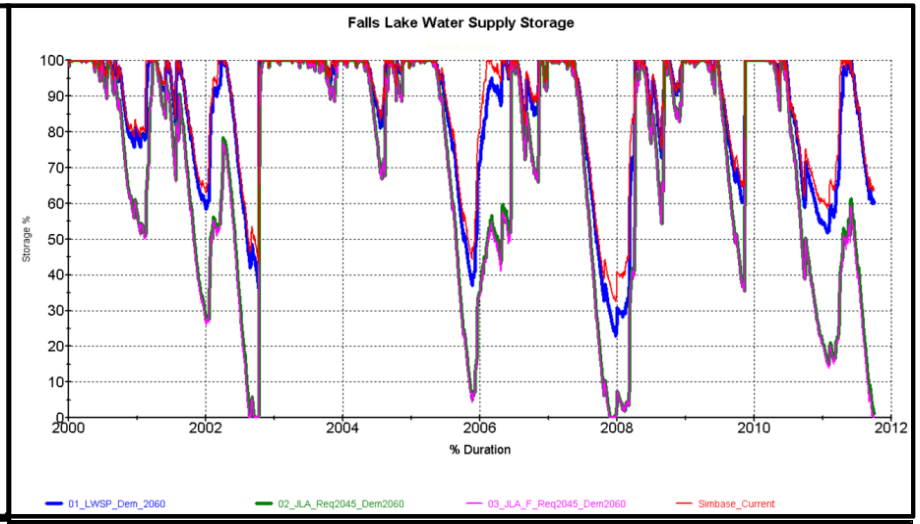
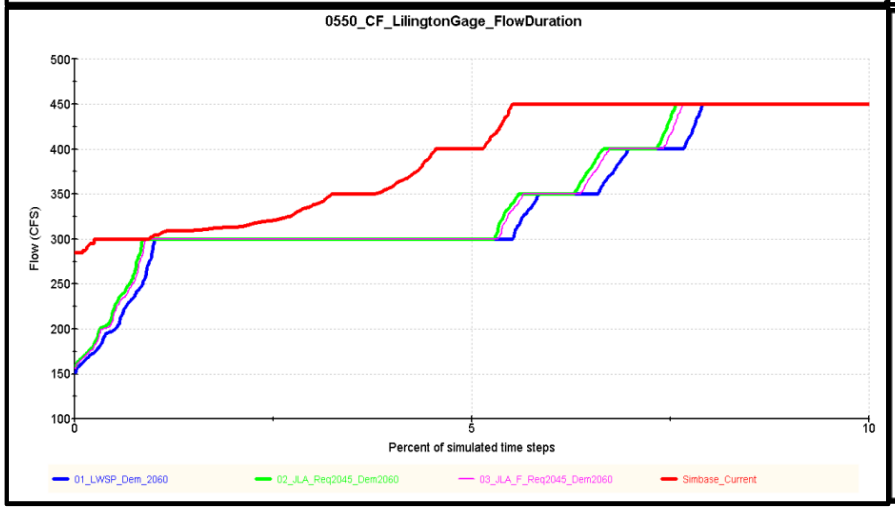
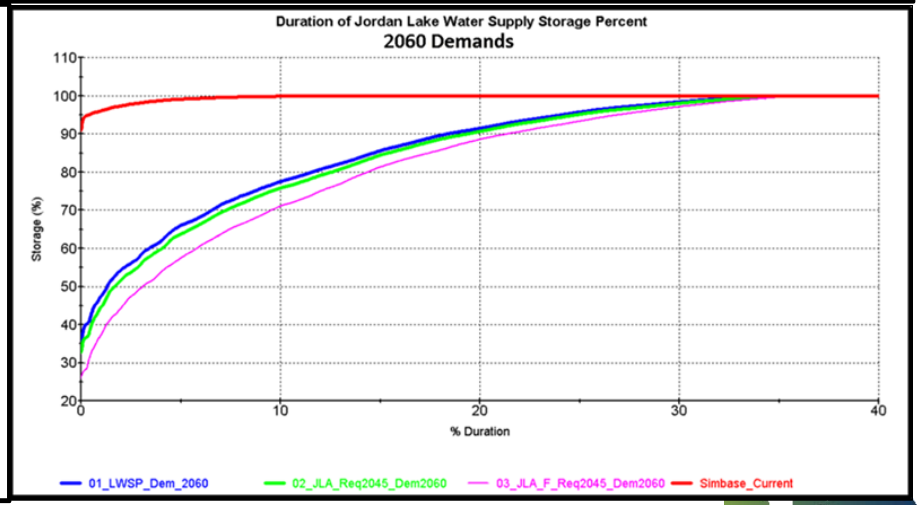
Changes in Conditions









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2060 Identified Supply Issues

- Greensboro will need more water from Randleman Reservoir which will require supporting the Piedmont Triad Regional Water Authority to increase the capacity of the water treatment plant.
- The increased water treatment capacity will provide increased reliability for all users of Randleman Reservoir
- Modeling indicates that Graham and Mebane may face a 3-week shortage meeting 2060 estimated demands during a repeat of the drought conditions in 2007-2008 or 1934
- Carthage may have difficulty reliably withdrawing it predicted 2060 demand amount from the existing source in Nicks Creek during some low flow periods. Carthage indicated in its local water supply plan the intention to convert an existing emergency connection with Southern Pines to a regular use sources. This is likely to address the potential shortages shown by the modeling.
- Chatham County – North system may face supply shortage is demand grows as expected to 2060. They have applied for an increased allocation from Jordan Lake but allocations are limited by rule to 30-year needs.

2060 Identified Supply Issues

- City of Raleigh Public Utilities Department water needs are included in this analysis because of the interconnections with water utilities in the Haw River Basin and they submitted an application for an allocation from Jordan Lake.
- Raleigh has been pursuing several options to increase their current raw water supplies. All of the options being considered involve extensive environmental reviews and regulatory requirements that require significant time to resolve before construction can begin.
- Modeling indicates Raleigh may face shortages of 13 mgd for up to 6 months trying to meet estimated 2045 demands from existing sources.
- Raleigh will need additional sources of water to reliably meet estimated 2060 water demands.
- Raleigh applied for a 4.7% allocation from the water supply pool in Jordan Lake. Modeling indicates that adding this volume of water to existing sources in combination with an aggressive water shortage response plan will address some of the potential shortages.

Conclusions

- The projections of future water supply sources includes increased use of water from the Jordan Lake water supply pool.
- The modeling results are inextricably linked to the wastewater return flows estimated in the model. If the wastewater return proportions vary from those modeled the conclusions will change.
- The model DOES NOT reserve water to protect ecological integrity. If this becomes a requirement in the future the modeling results and conclusions will change.
- Water Quality may present difficulties treating raw water to drinking water standards
- Presence of critical habitat my limit the ability to withdraw the desire amount of water
- Modeling indicates that except for the issues highlighted on the previous slides the water systems using surface water from the Deep River, Haw River, Cape Fear River, Neuse River and Contentnea Creek Subbasins are not likely to face flow related shortages over the range of flow conditions captured by the 81 years of historic data.

Jordan Lake Water Supply Allocation Recommendations

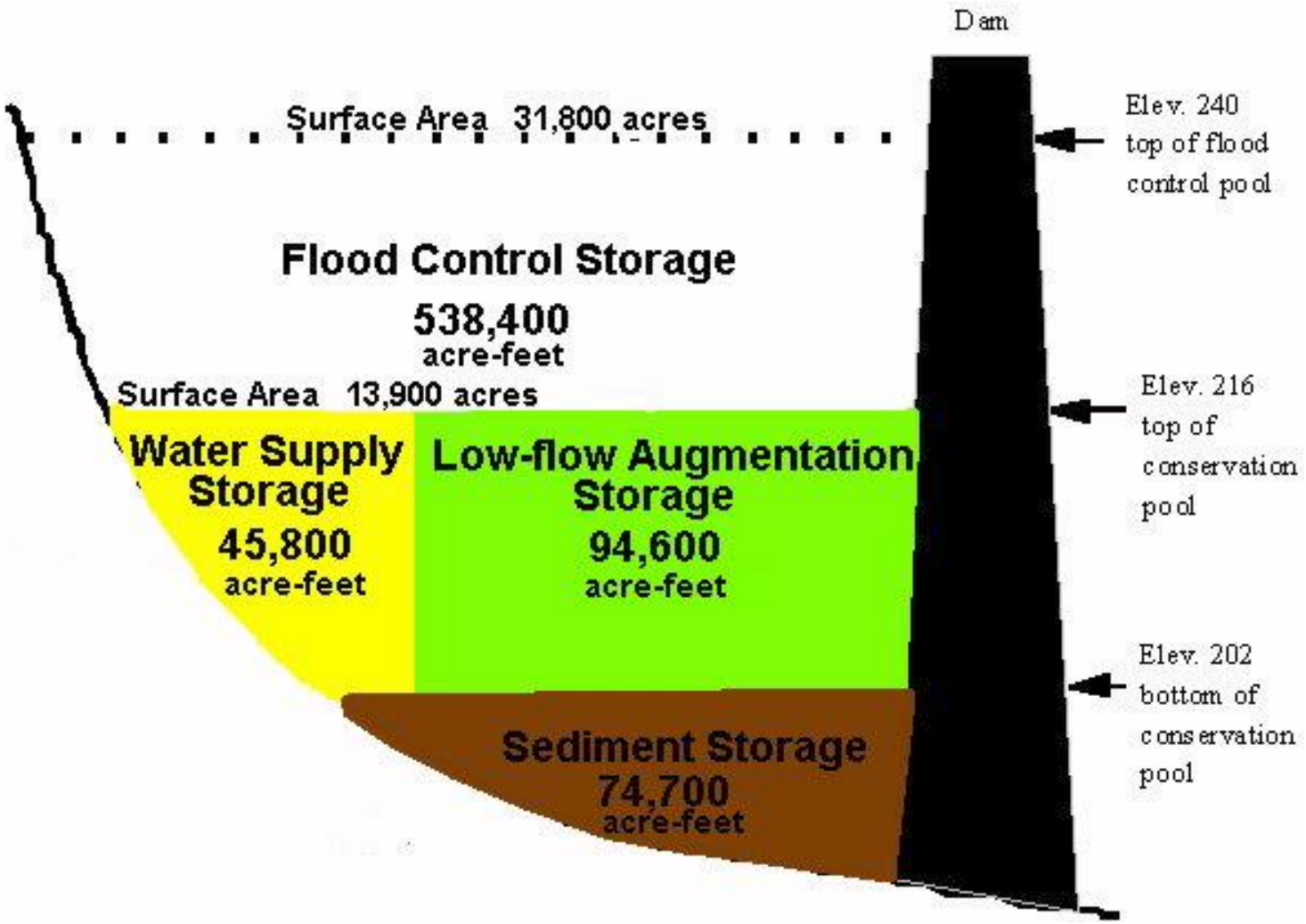
December 28, 2015

Department of Environmental Quality
Division of Water Resources

Background

- **During the design of the B. Everett Jordan Project the State of North Carolina requested the inclusion of water supply storage capable of yielding 100 million gallons per day**
- **NC assumed responsibility for paying the additional cost associated with the water supply component (32.62% of Conservation Storage)**
- **NCGS § 143-354(a)(11) gives the EMC authority to allocate water supply storage in Jordan Lake to local governments**
- **Long-range planning by regional water utilities identified future needs that exceed currently available water supplies**
- **Jordan Lake Partnership petitioned DWR to initiate a fourth round of water supply allocations**
- **February 2010 the EMC gave the Division the go-ahead**
- **November 2014 Applications submitted**
- **2015 DWR modeled information in applications and interpreted results**
- **January 2016 draft allocation recommendations based on information provided in allocation applications and hydrologic modeling of surface water sources**

Generalized Jordan Lake Storage Schematic



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Summary of Allocation Guidelines

- **Allocation Decisions**
  - **Limited to 30-year planning horizon (2045)**
  - **Limit diversions off the Jordan Lake watershed to 50% of the water supply yield**
  - **Based on need for water and commitment to pay for allocation ($91,041/%)**
  - **Rules governing allocations request additional information from applicants**
    - **Yield of current sources**
    - **Alternative sources**
    - **Service population projections**
    - **Future water demand projections**
    - **How will allocation be used**
    - **Monitoring requirements**
    - **Arrangements to share water**
  - **Allocations can be rescinded or reassigned by the EMC**
  - **If an allocation would lead to the need for an Interbasin Transfer Certificate the application for the IBT Certificate must be considered along with the allocation**

Requested Allocations

63% water supply storage allocated

DWR received

- **10 applications for**
- **13 local governments**

105.9% Total Round 4 allocation requests

Jordan Lake Water Supply Pool		
Applicant	Current Allocation Percent	JLA-4 Requested Allocation Percent
Cary Apex Morrisville RTP	39	46.2
Chatham Co North*	6	13
Durham*	10	16.5
Holly Springs	2	2
Hillsborough	0	1
OWASA*	5	5
Orange Co	1	1.5
Pittsboro*	0	6
Raleigh	0	4.7
Fayetteville	0	10
Total Percent	63.0	105.9
* Western Intake Partners		

Population Estimates

Applicants Estimated Service Population					
JLA-4 Applicants	**County Served**	**2010**	**2035**	**2045**	**2060**
Cary-Apex-Morrisville-WakeCoRTP	Wake / Chatham	182,600	309,600	344,150	360,600
Chatham Co-North	Chatham	10,200	49,450	65,350	94,000
Pittsboro	Chatham	3,700	69,250	83,500	96,800
Durham	Durham	246,180	350,922	393,924	458,426
Hillsborough	Orange	12,216	22,150	26,600	33,800
Holly Springs	Wake	24,700	68,371	81,931	103,261
Orange County	Orange	132	11,897	17,185	25,115
OWASA	Orange	79,400	115,700	129,950	149,700
Raleigh	Wake	485,219	879,441	1,048,700	1,316,200
Fayetteville PWC	Cumberland	199,102	350,574	398,380	440,390
	Total Service Population	1,243,449	2,227,355	2,589,670	3,078,292

Estimated County Population				
County	**2010**	**2035**	**2045**	**2060**
CHATHAM	63,751	93,544	105,802	124,189
CUMBERLAND	327,445	375,428	396,220	427,407
DURHAM	271,297	397,205	446,627	520,761
ORANGE	134,303	178,148	196,202	223,284
WAKE	906,909	1,433,761	1,657,599	1,993,356
Total Estimated Population	1,703,705	2,478,086	2,802,450	3,288,996
http://www.osbm.state.nc.us/ncosbm/facts_and_figures/socioeconomic-data.shtm				
Estimated 1990-2034 & extensions				

Water Demands (MGD)

(Million Gallons per Day)

Applicants Estimated Average Day Demand (MGD)					
JLA-4 Applicants	**County Served**	**2010**	**2035**	**2045**	**2060**
Cary-Apex-Morrisville-WakeCoRTP	Wake / Chatham	20.72	40.82	45.82	48.33
Chatham Co-North	Chatham	2.16	10.13	13.03	18.12
Pittsboro	Chatham	0.56	8.41	9.92	11.24
Durham	Durham	25.27	36.12	39.98	44.37
Hillsborough	Orange	1.17	2.87	3.22	3.70
Holly Springs	Wake	1.98	6.23	7.24	8.78
Orange County	Orange	0.02	2.01	2.81	3.92
OWASA	Orange	7.86	10.24	11.32	12.91
Raleigh	Wake	52.75	84.76	97.02	115.01
Fayetteville PWC	Cumberland	28.01	55.03	65.41	78.92
Total Estimated Average Day Demand		140.50	256.62	295.77	345.30

Estimated System Demand based on Estimated County Population (MGD)				
Based on projected county population figures and average				
2010 system wide per capita use of applicants in each county				
County	**2010**	**2035**	**2045**	**2060**
CHATHAM	11.60	17.02	19.25	22.60
CUMBERLAND	46.07	52.82	55.75	60.14
DURHAM	27.85	40.77	45.85	53.46
ORANGE	16.90	22.42	24.69	28.10
WAKE	91.40	144.49	167.05	200.89
Total Estimated Demand	193.82	277.53	312.59	365.18

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Cary, Apex, Morrisville, Wake County-RTP

Cary,Apex,Morrisville,WakeCo-RTP		2010	2015	2035	2045	2060
MaxMonMultiplier	Service Population	182,600	201,200	309,600	344,150	360,600
1.4	Maximum Month Daily Demand	29.01	33.36	57.15	64.15	67.66
	Annual Average System Demand (MGD)	20.72	23.83	40.82	45.82	48.33
Cary & Apex	Demand	18.40	20.90	34.80	39.15	41.40
Morrisville	Demand	1.72	2.03	3.32	3.47	3.63
RTP-South	Demand	0.60	0.90	2.70	3.20	3.30
JLA4 Request	Average Annual System Demand (MGD)	20.72	23.83	40.82	45.82	48.33
	Water Sources	39.00	46.20	46.20	46.20	46.20
	Current Jordan Lake Allocation	39	39	39	39	39
	JLA4 Allocation		7.2	7.2	7.2	7.2
Cary-Apex-Morrisville-Wake Co RTP	**Total JLA4 Allocation Request**	**39**	**46.2**	**46.2**	**46.2**	**46.2**

- Alternative Sources
  - Increased allocation from Jordan Lake
  - Cape Fear River Withdrawal (Harnett County)
  - Crabtree Creek and Triangle Quarry
  - Kerr Lake

Chatham County

Chatham County-North		2010	2015	2035	2045	2060
MaxMonMultiplier	Service Population	10,200	18,050	49,450	65,350	94,000
1.36	Maximum Month Daily Demand	2.94	5.07	13.77	17.72	24.64
	Annual Average System Demand (MGD)	2.16	3.73	10.13	13.03	18.12
JLA4 Request	Average Annual System Demand (MGD)	2.16	3.73	10.13	13.03	18.12
	Water Sources	6	13	13	13	13
	Jordan Lake Allocation	6				
Chatham County-North	**JLA4 Request**		**13**	**13**	**13**	**13**

- Alternative Sources
  - Increased allocation from Jordan Lake
  - Cape Fear River (Harnett County)

Raleigh Public Utilities Department

Raleigh Public Utilities Department		2010	2015	2035	2045	2060
MaxMonMultiplier	Service Population	485,219	561,882	879,441	1,048,700	1,316,200
1.181	Maximum Month Daily Demand	62.30	69.61	100.10	114.58	135.82
	Annual Average System Demand (MGD)	52.75	58.95	84.76	97.02	115.01
JLA4 Request	Average Annual System Demand (MGD)	52.75	58.95	84.76	97.02	115.01
	Water Sources total	77.30	77.30	82.00	82.00	82.00
	Falls lake	66.1	66.1	66.1	66.1	66.1
	L.Benson/ L.Wheeler	11.2	11.2	11.2	11.2	11.2
Raleigh	**JLA4 Request**	**0**	**0**	**4.7**	**4.7**	**4.7**
	Supply Surplus	24.55	18.36	(2.76)	(15.02)	(33.01)

- Alternative Sources
  - Reallocation of storage in Falls Lake
  - Neuse River Intake
  - Raleigh Quarry
  - Purchase
  - Little River Reservoir

Durham

Durham		2010	2015	2035	2045	2060
MaxMonMultiplier	Service Population	246,180	266,300	350,922	393,924	458,426
1.182	Maximum Month Daily Demand	29.87	33.05	42.69	47.25	52.45
	Annual Average System Demand (MGD)	25.27	27.97	36.12	39.98	44.37
JLA4 Request	Annual Average System Demand (MGD)	25.27	27.97	36.12	39.98	44.37
	Water Sources total	37.90	44.40	44.40	44.40	44.40
	Lake Michie/Little River Reservoir	27.9	27.9	27.9	27.9	27.9
Durham	**JLA4 Request**	**10**	**16.5**	**16.5**	**16.5**	**16.5**

- Alternative Sources
  - Increased use of reclaimed water
  - Teer Quarry
  - Raise Lake Michie (to 365’ or 380’)

Fayetteville Public Works Commission

Fayetteville Public Works Commission		2010	2015	2035	2045	2060
MaxMonMultiplier	Service Population	199,102	226,655	350,574	398,380	440,390
1.208	Maximum Month Daily Demand	33.84	37.43	66.47	79.02	95.34
	Annual Average System Demand (MGD)	28.01	30.98	55.03	65.41	78.92
JLA4 Request	Annual Average System Demand (MGD)	28.01	30.98	55.03	65.41	78.92
	Water Sources total	95.70	105.70	105.70	105.70	105.70
	Cape Fear River	90.3	90.3	90.3	90.3	90.3
	Big Cross Creek	0.9	0.9	0.9	0.9	0.9
	Little Cross Creek	4.5	4.5	4.5	4.5	4.5
Fayetteville PWC	**JLA4 Request**	**0**	**10**	**10**	**10**	**10**

- Alternative Sources
  - New Reservoir in Cumberland County
  - Blewett Falls Reservoir

Hillsborough

Hillsborough		2010	2015	2035	2045	2060
MaxMonMultiplier	Service Population	12,216	14,508	22,150	26,600	33,800
1.068	Maximum Month Daily Demand	1.25	1.86	3.07	3.43	3.95
	Annual Average System Demand (MGD)	1.17	1.74	2.87	3.22	3.70
JLA4 Request	Annual Average System Demand (MGD)	1.17	1.74	2.87	3.22	3.70
	Water Sources total	2.60	3.60	4.80	4.80	4.80
	Upper Eno Res Sys	2.6	2.6	2.6	2.6	2.6
	WF Eno Res Expansion (In Process)			1.2	1.2	1.2
Hillsborough	**JLA4 Request**	**0**	**1**	**1**	**1**	**1**

- Alternative Sources
  - Expand West Fork Eno Reservoir

Holly Springs

Holly Springs		2010	2015	2035	2045	2060
MaxMonMultiplier	Service Population	24,700	35,705	68,371	81,931	103,261
1.221	Maximum Month Daily Demand	2.42	4.07	7.61	8.84	10.72
	Annual Average System Demand (MGD)	1.98	3.34	6.23	7.24	8.78
JLA4 Request	Annual Average System Demand (MGD)	1.98	3.34	6.23	7.24	8.78
	Water Sources total	12.00	12.00	12.00	12.00	12.00
	Cape Fear River (Harnett Co RWS)	10	10	10	10	10
Holly Springs	**JLA4 Request**	**2**	**2**	**2**	**2**	**2**

- Alternative Sources
  - Increase purchase from Harnett County Regional Water System
  - Cape Fear River Intake
  - Purchase from Raleigh

Orange County

Orange County		2010	2015	2035	2045	2060
MaxMonMultiplier	Service Population	132	2,049	11,897	17,185	25,115
1.077	Maximum Month Daily Demand	0.03	0.39	2.16	3.03	4.22
	Annual Average System Demand (MGD)	0.02	0.36	2.01	2.81	3.92
JLA4 Request	Annual Average System Demand (MGD)	0.02	0.36	2.01	2.81	3.92
	Water Sources total	1.25	1.75	2.25	2.25	2.25
	From Mebane	0.25	0.25	0.25	0.25	0.25
	Mebane Increase			0.5	0.5	0.5
	Current Jordan Lake Allocation	1	1	1	1	1
Orange County	**JLA4 Request**	**1**	**1.5**	**1.5**	**1.5**	**1.5**

- Alternative Sources
  - Increase purchase from Mebane

Orange Water and Sewer Authority

Orange Water and Sewer Authority		2010	2015	2035	2045	2060
MaxMonMultiplier	Service Population	79,400	86,850	115,700	129,950	149,700
1.142	Maximum Month Daily Demand	8.98	9.24	11.69	12.93	14.74
	Annual Average System Demand (MGD)	7.86	8.09	10.24	11.32	12.91
JLA4 Request	Annual Average System Demand (MGD)	7.86	8.09	10.24	11.32	12.91
	Water Sources total	15.50	15.50	17.60	17.60	17.60
	UnivLake/CaneCrk Sys	10.5	10.5	10.5	10.5	10.5
	Future Stone Quarry Expansion	0	0	2.1	2.1	2.1
OWASA	**JLA4 Request**	**5**	**5**	**5**	**5**	**5**

- Alternative Sources
  - Increase planned Stone Quarry Expansion
  - Increase reclaimed water use
  - Haw River Intake

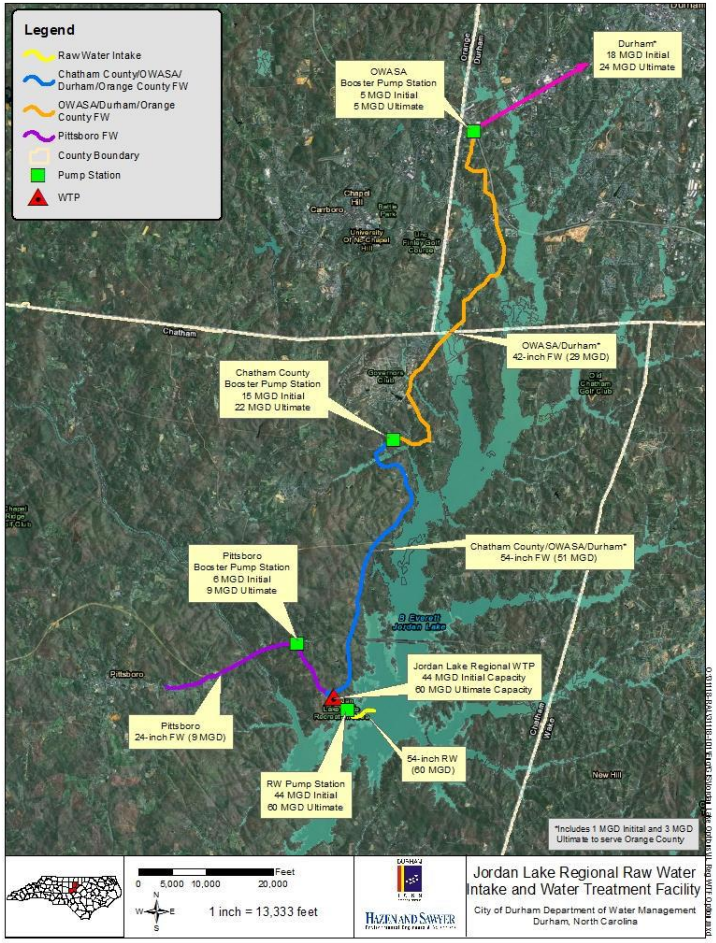
Pittsboro

Pittsboro		2010	2015	2035	2045	2060
MaxMonMultiplier	Service Population	3,700	13,850	69,250	83,500	96,800
1.15	Maximum Month Daily Demand	0.65	2.07	9.67	11.41	12.93
	Annual Average System Demand (MGD)	0.56	1.80	8.41	9.92	11.24
JLA4 Request	Annual Average System Demand (MGD)	0.56	1.80	8.41	9.92	11.24
	Water Sources total	2.00	8.00	12.00	12.00	12.00
	Existing Haw River	2	2	2	2	2
	Haw River Expansion			2	2	2
	Haw River Expansion			2	2	2
Pittsboro	**JLA4 Request**	**0**	**6**	**6**	**6**	**6**

- Alternative Sources
  - Increase Jordan Lake Allocation

Western Jordan Lake Intake Proposal

- Western Jordan Lake Intake and Water Treatment Plant
- Partners
  - Durham
  - Orange Water and Sewer Authority
  - Pittsboro
  - Chatham County-North
- Construct Intake, WTP and transmission lines to access allocations if approved
- Optimizes use of water supply storage
  - Estimated yield > 100 mgd
  - Current raw water pumping capacity 80 mgd
- May improve Raleigh's supply



Department of Environmental Quality

Recommendations

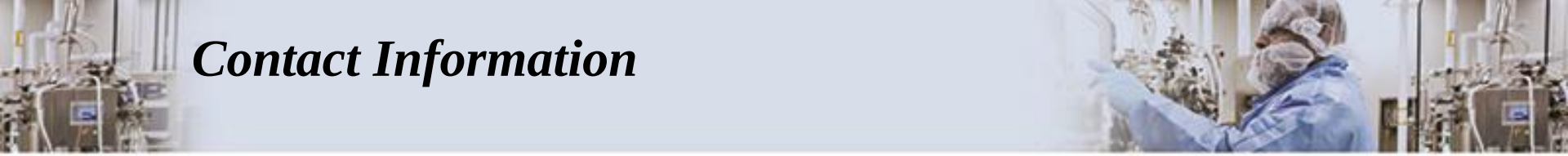
Jordan Lake Water Supply Pool			
Applicant	Current	JLA-4 Requested	Draft Recommended
	Allocation Percent	Allocation Percent	Allocation Percent
Cary Apex Morrisville RTP	39	46.2	46.2
Chatham Co North*	6	13	13
Durham*	10	16.5	16.5
Holly Springs	2	2	2
Hillsborough	0	1	1
OWASA*	5	5	5
Orange Co	1	1.5	1.5
Pittsboro*	0	6	6
Raleigh	0	4.7	0
Fayetteville	0	10	0
Total Percent	63.0	105.9	91.2
* Western Intake Partners			

- Recommend approval of requested allocations except Raleigh and Fayetteville PWC
- Modeling indicates Fayetteville does not face flow related shortages through 2060 from existing sources
- Raleigh has not initiated the process to get an IBT Certificate which would be needed for an allocation.
- Raleigh's alternative proposal for a Cape Fear River withdrawal and WW discharge could provide the requested amount of water without an allocation

Next Steps

- **Notify public of the availability of**
  - **Applications and supporting documents**
  - **Notes and presentations from Round 4 meetings**
  - **Draft Cape Fear River Water Supply Evaluation**
  - **Draft Jordan Lake Water Supply Allocation Recommendations**
- **Establish a comment period**
- **Schedule a public meeting to review the process and analysis and to receive comments**
- **Respond to comments**
- **Revise documents as necessary**
- **Bring final documents to EMC later this year**
- **Approval of Round 4 Jordan Lake Water Supply Allocations**

Contact Information



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  Links to sign-up for mailing list notifications are available on the Jordan Lake Water Supply Allocation webpage at:
  http://www.ncwater.org/?page=317

  Cape Fear-Neuse River Basins Hydrologic Model information is available at:
  http://www.ncwater.org/?page=624

  The main Division of Water Resources Website can be found at:
  http://portal.ncdenr.org/web/wq/