National Weather Service
Southeast River Forecast Center


Location: **Inflows into Lake Allatoona – Georgia**

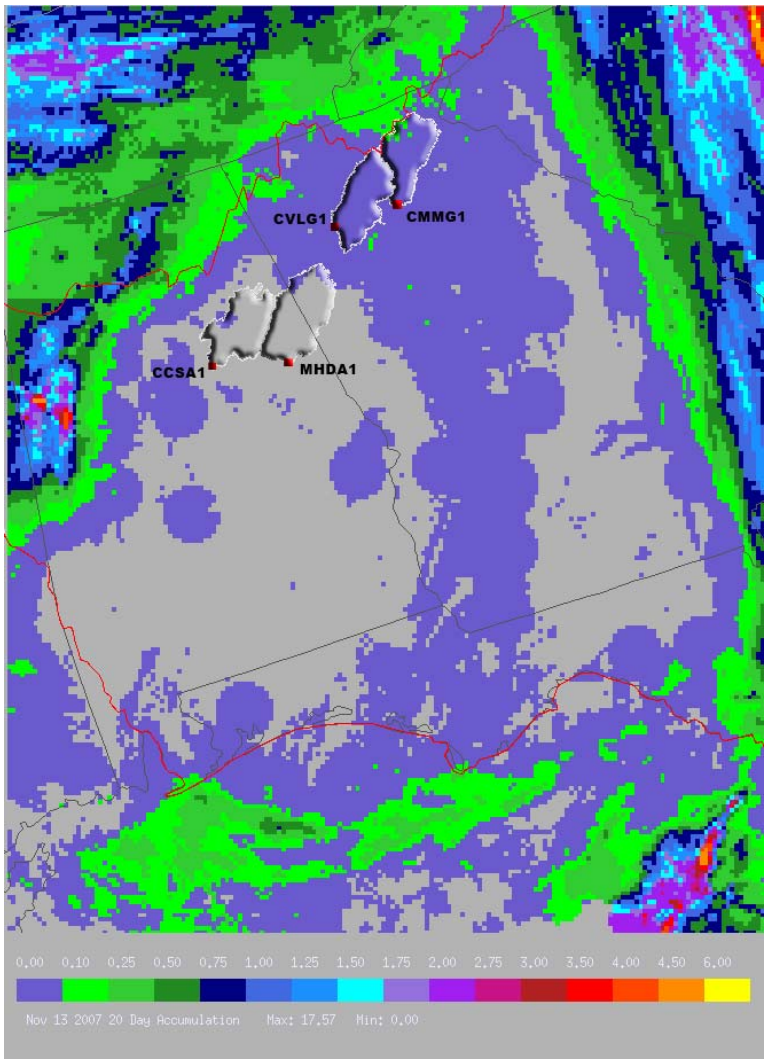
Updated November 15, 2007

…Significant Drought Relief Not Expected Into Early December…

**Our Forecast – Key Points**

- A little more rain, but minimal hydrological significance.
- Increasing frontal passages, but fast movement will limit rainfall.
- Three to four inches of rainfall needed before significant runoff and reservoir inflow commences.

Hydrometeorological Basin Analysis




Some of the driest weather of the fall occurred over the past few weeks. Following is a multi-sensor rainfall estimate from the Southeast River Forecast Center for a 20-day period ending November 13th.

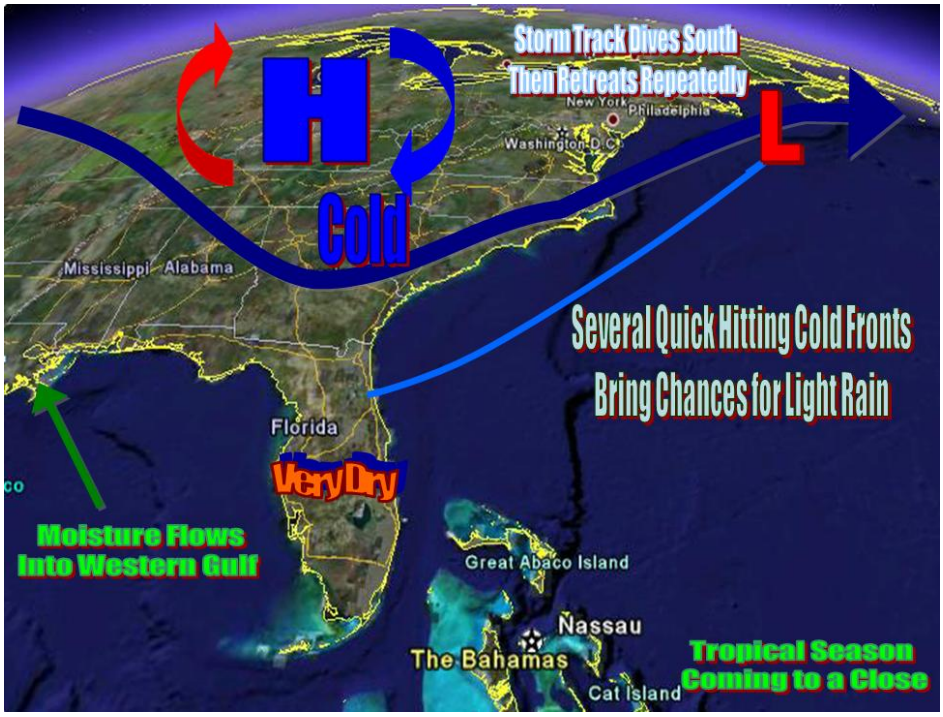
Lakes Lanier (CMMG1) and Allatoona (CVLG1) in Georgia and Logan Martin (CCSA1) and Harris Reservoirs (MHDA1) in Alabama are highlighted.

All of these drainage areas received less than 0.10 inches of rainfall since late October. Many of these areas are a foot or more below normal rainfall for the year.

0.10 inch or less rainfall.

Virtually zero rainfall for a 20-day period ending November 13th.

Looking Ahead Into December




Last week, several numerical (medium-range) meteorological models hinted at a significant rain event for the Southeast U.S. with the possibility of one to three inches of rain over North Georgia. This event was forecast to be similar to our last decent rain event way back in mid October. At that time, a cut-off low developed and remained stationary over Alabama, funneling abundant moisture northward from the Gulf and in from the Atlantic.

Unfortunately, these models gradually began to downplay the rain system as it neared, forecasting less than a half inch for north Georgia.

Meteorological models typically trend towards climatology beyond seven days out. Late November and early December is a transition time as we head from fall into winter. Models tend to forecast “typical” weather after seven days.

One issue we have this year is that it is definitely not “typical.” As we head into December, the area transitions from the dry and quiet fall into the more volatile winter, with stronger weather systems. Often times, a surface low will develop which will help transport moisture from the Gulf of Mexico into the Southeast U.S., thereby increasing chances of rain.

While this is what would typically happen, there is currently no sign for this transition to occur anytime soon. Current weather patterns seem to be about three weeks behind schedule. Thus, the short-term weather is tending towards a quiet fall pattern than a more active winter regime.

For the rest of November, quick hitting cold fronts will bring deep upper troughs into the Southeast U.S., with pushes of very chilly air. These fronts are expected to move so fast that there will not be enough time for the transport of moisture from the Gulf. Unfortunately, this will limit the chance for significant rainfall.

Looking ahead through November into early December, northern portions of Georgia and Alabama will see one or two cold front passages per week, each with a chance of rain. Due to the progressive nature of these fronts, each rain event will last for only a six-hour period or so. Total basin average rain accumulations through the end of November will be 1.0 to 1.5 inches across north Georgia.

Longer-range climate models predict a dry December, but by the end of November it will be evident whether or not a shift into a winter weather pattern will happen anytime soon …or not.

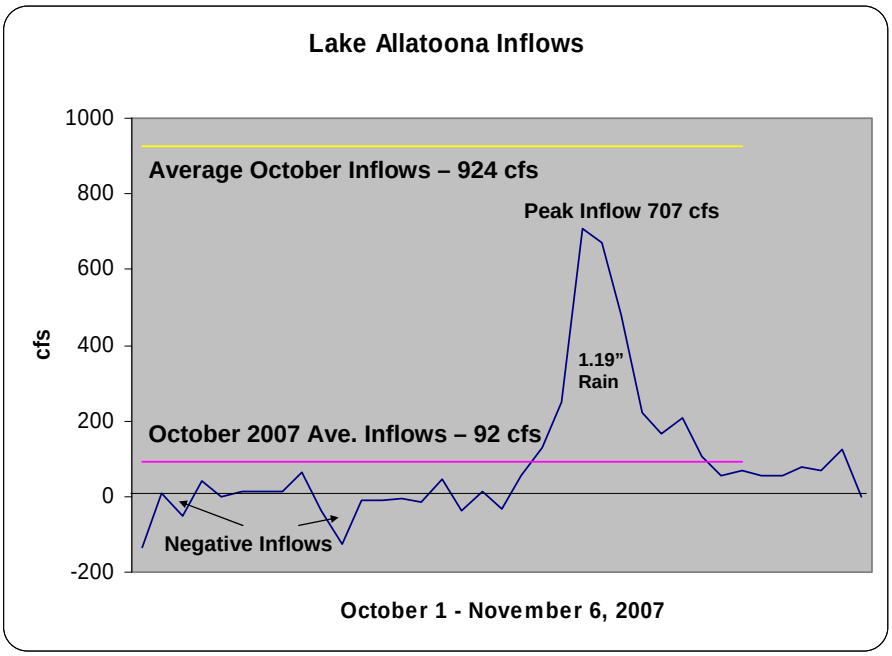
Inflow Considerations

Once rains start, needed inflows into reservoirs will not immediately commence. The SERFC has calculated some general inflow scenarios.

| Inches of Rainfall | Hydrologic Impact Across Northern Alabama/Georgia |
|---|---|
| 1 inch | Minimal runoff and inflow. Modest recharge of upper soils. No change in reservoir elevations due to inflow. |
| 2 – 3 inches | Minimal runoff and inflow. Significant recharge of upper soils. Steady reservoir elevation or minimal rise due to increased inflows. |
| 3 – 4 inches | Start of more significant runoff and inflow. Notable rises on smaller tributaries. Slight to modest rises on larger streams. Modest reservoir elevation rises due to increased inflows. |
| 4 – 6 inches | Significant runoff and inflow. Significant rises on smaller tributaries. Notable rises on larger streams. More significant reservoir elevation rises due to increased inflows. |

In summary, improvement in reservoir pool elevations will depend on the intensity, duration, and frequency of rain events. Rough estimates would indicate that it will take three to four inches of rainfall before inflows increase to such a degree to produce modest reservoir rises.

The following graphic shows inflows into Lake Allatoona, Georgia, since October 1st. The blue trace plots daily average inflows into the lake. Note that over this 37-day period, there have been times of negative inflow, primarily early in October. During these periods, only a trickle of water was entering the lake, while outflows and evaporation exceeded any inflow.



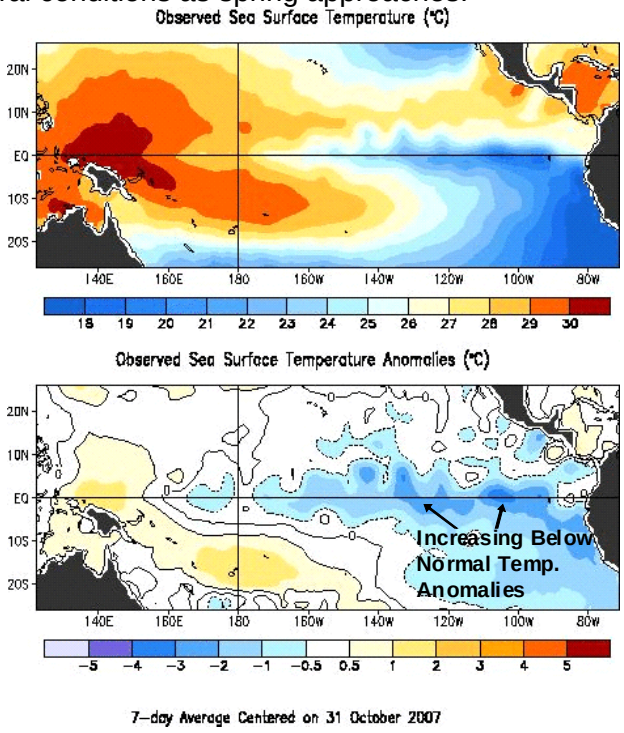

From October 23-25th, 1.19 inches of rain fell. This caused the spike in inflows for about a one-week period. These inflows peaked around 700 cfs before falling. The purple trace indicates the average inflow for October, while the yellow line is the historical average. Note how far the October inflow line is below the historical average line.

Even this period of enhanced inflow in late October did not near the historically average.

Based on the lack of any significant rain over the past two weeks, inflows again dropped off late in October and early in November and once again neared zero or even negative levels.

Longer-Term Outlook

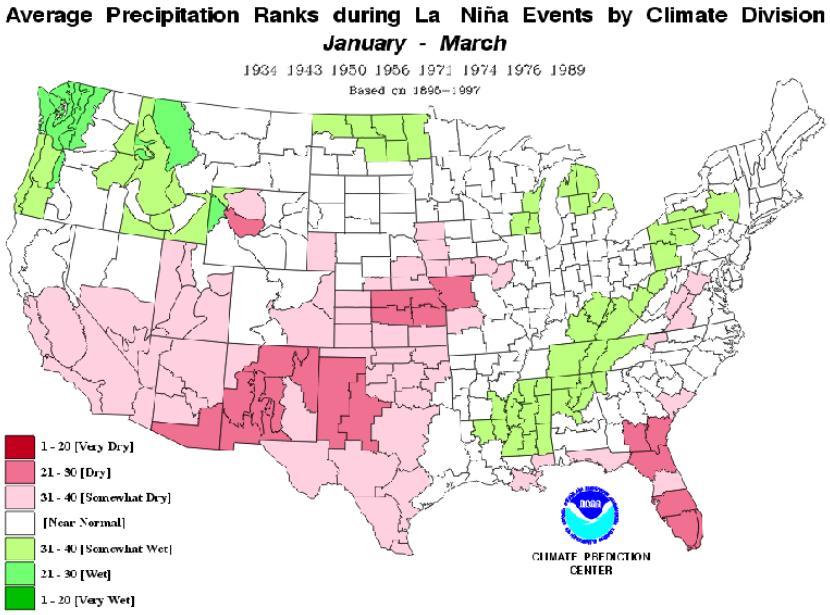
The longer-term outlook provided by the Climate Prediction Center (CPC) is closely tied to the current La Nina conditions in the equatorial Pacific Ocean. As seen in the graphic below, below-normal temperatures across the Pacific support a moderate La Nina as temperatures continue to stay over 1.0 degree below normal for this time of year. The La Nina episode is forecast to continue at least through the end of the year, with a possible shift to neutral conditions as spring approaches.




La Nina doesn't typically have as strong a signal as El Nino in the Southeast. However, with a *moderate* La Nina, there *is* a stronger correlation. The average precipitation ranks for La Nina years are shown below and indicate the possibility of having above-normal rainfall for northern Mississippi, northern Alabama, and at least northwest Georgia. Below-normal precipitation is expected in Florida and South Georgia for the January-to-March time frame. Southwest Georgia and Northern Florida are starting in much better shape due to rainfall during the tropical season that left much of their rivers and soil moisture conditions near normal. Lake Okeechobee in south Florida continues setting record low levels, which will cause problems for many in South Florida.

Although forecasters are concerned about a potentially dry winter, there is some hope for those in the previously mentioned areas. The gradient between the forecast below-normal precipitation in South Georgia and above-normal in north Georgia is very tight.

In addition, these statistics were taken using 8 La Nina events from 1896 to 1997, which is a small forecast sample size. However, they seem pretty consistent along the Appalachians corridor all the way into Mississippi.




Technical Discussion

The following graphs show the following: Maximum, Minimum, Distributed Standard Deviation, and the Distributed Mean values over a period of 45 days on one graphic. These values are computed and plotted for each day in the forecast period.

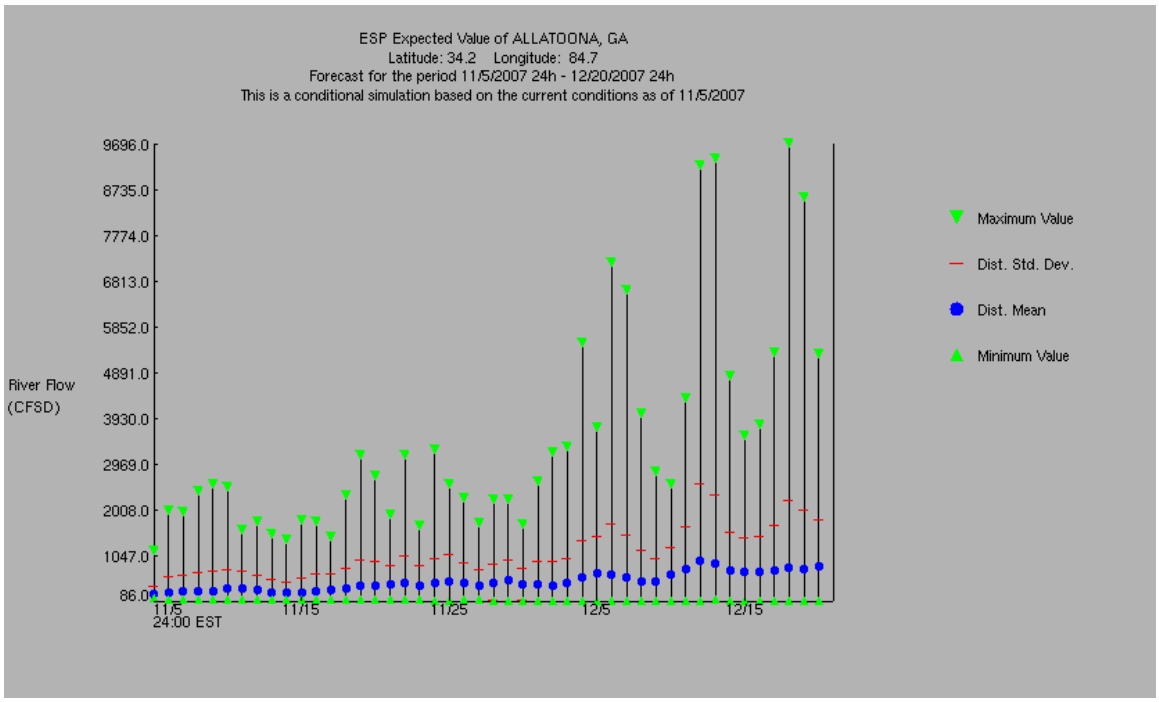
-The Maximum Value is the highest stage expected, based on recorded historical climate data as input to the hydrologic model, and on a basin's current conditions including soil moisture conditions.

-The Minimum Value is the lowest stage expected based on these same data and conditions.

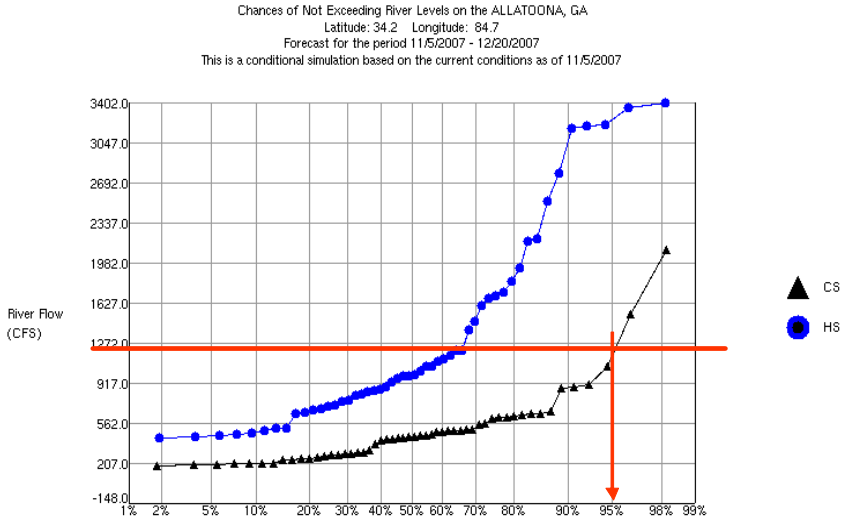
-The Distributional Mean can be interpreted as an average simulated stage for a given day produced by any of the yearly climate scenarios.

-The Distributional Standard Deviation provides confidence levels and defines a range within which approximately 68% of the simulated daily stage values are expected to fall.

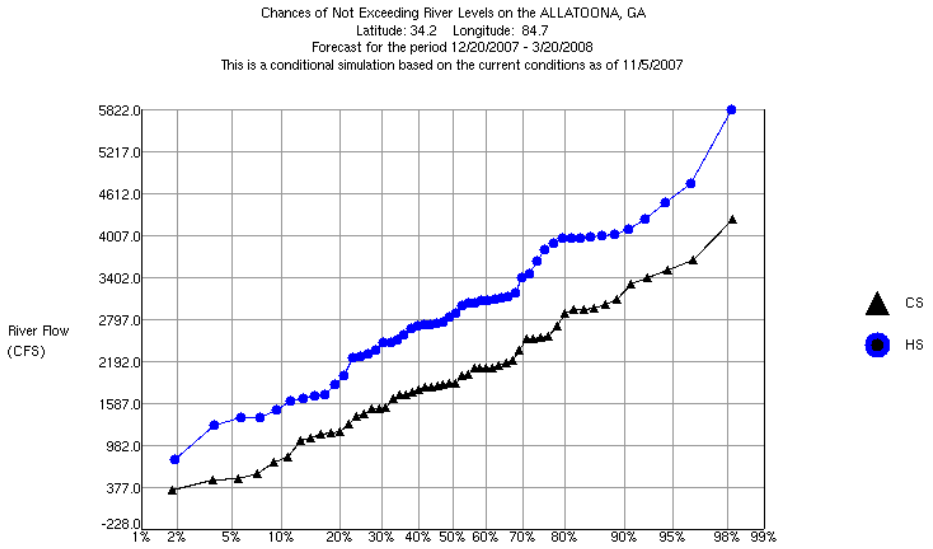
This graphic is for Lake Allatoona and shows expected values from November 5 to December 20. Notice how the range between the Max and Min values increase as December approaches. November is typically a pretty dry month climatologically in North Georgia. As winter approaches and frontal systems begin to move into the area, evaporation rates decrease, which makes runoff more likely from rainfall. All these factors increase the chance that rainfall is more likely during December and further into the winter months of 2008.




One other way to show how these changes are showing up in climatology is to look at nonexceedance probability plots for inflows to the same segments.




There is a 95% likelihood that average inflows (black line) will be less than normal (blue line) over the next 45 days.

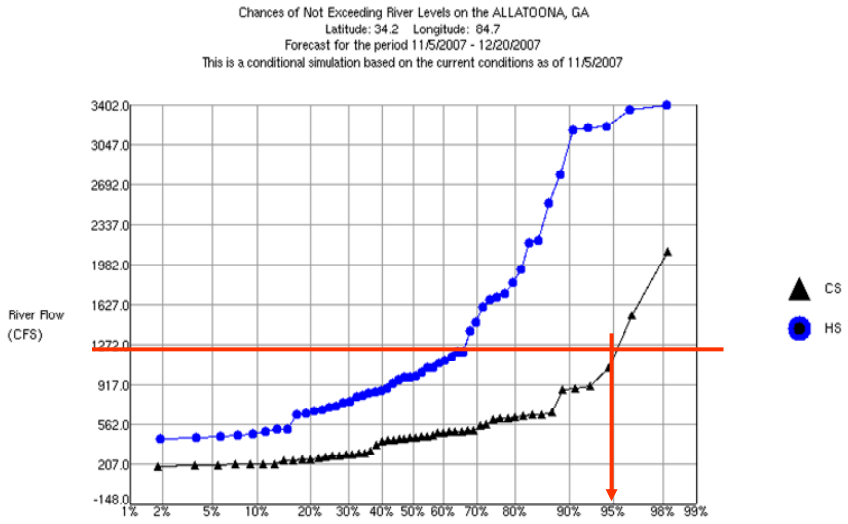



Both graphs show chances of not exceeding mean flow levels into Lake Allatoona reservoir with conditional and historical plots. The difference between the two graphs is that the top one is for the time frame from November 5th to December 20th, while the other is for the winter season from December 20th to March 20th, 2008. There are two trends to notice when comparing these two graphs:

1) In the top graph, which only encompasses 45 days, the *conditional* plot restarts each run with initial conditions on day 1 of the run (11/5) and then runs each of the 54 years to get a mean trace. The second graph initializes from the same day. However, the model then runs for 45 days (12/20), and then we begin using the output for the graph. In the top graph there is more separation between the conditional and historical plots than in the second graph. The reason for this is that initial conditions are so dry that the conditional plot initializes from the dry conditions and the historical tries to simulate what actually happened during that time. The second plot is less affected by initial conditions and therefore is edging toward climatology. This is the main reason we continue to look at a 45-day window for Ensemble Streamflow Prediction.

2) The flow level on the top of the vertical axis goes from about 3400 cfs to about 5800 cfs from the top to the bottom graph. This is also indicative of a climatological shift from the fall to the winter, which is typically our wettest time to the year. It is also the most likely time for recharge of the reservoirs.

One difference between Lake Allatoona and Lake Lanier is management of the lake. Allatoona has a summer pool of 840 ft which is lowered to 823 ft in December and January to help with flood control. Lake Lanier has a minimal drawdown due to the large capacity of the lake being utilized for flood control. This year, Allatoona did not have to draw down their pool to winter levels because of the dry Summer and Fall. The lake is already very near to its winter pool. The hope is that rainfall will make it possible to refill over the winter.




There is a 95% likelihood that average inflows (black line) will be less than normal (blue line) over the next 45 days.

Lake Allatoona is at an unusually low stage for this time of the year. However, an analysis of past years shows that it is likely that lake levels will rebound to some degree by spring.

This same analysis also shows that there have been drought years when this rebound was minimal or did not occur. In consideration of the already low levels, prudent conservation actions are warranted.

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