

Memorandum

To: Georgia Regional Water Planning Councils – Altamaha, Coastal, Middle Ocmulgee, Savannah-Upper Ogeechee, Suwannee-Satilla and Upper Oconee

From: EPD and EPD Planning Contractors (CDM Smith and Jacobs Engineering)

Date: August 29, 2016

*Subject: June 23, 2016 Georgia Regional Water Planning Council Joint Meeting
2016-2017 Regional Water Plan Review and Revision Process
Joint Council Meeting # 1 Summary*

This memorandum provides the meeting summary of the June 23, 2016 Georgia Regional Water Planning Council Joint Meeting #1, held on June 23, 2016 at the Oconee Fall Line Technical College (Dubose Porter Center) in Dublin, GA. The Joint Council Meeting was held for the six eastern Regional Water Planning Councils (Altamaha, Coastal Georgia, Middle Ocmulgee, Suwannee-Satilla, Savannah-Upper Ogeechee and Upper Oconee) from 10 AM to 3 PM. This memorandum provides a summary of the items presented by EPD and joint sessions held between Councils.

1) Welcome and Introductions

Gail Cowie with the Environmental Protection Division (EPD) of the Georgia Department of Natural Resources opened the Joint Council Meeting with welcome and introductions. Gail introduced each of the 6 Councils, the Council Chairs, and had each member raise their hand. Gail also introduced members present from the Metropolitan North Georgia Water Planning District (Metro District). Gail then introduced the other EPD staff in attendance and the Planning Contractors who were present to assist EPD with the Joint Council Meeting and the Regional Water Plan review and revision process. Gail also noted several of the other stakeholders and agencies present who are participating in the review and revision process.

Gail then briefly reviewed the Regional Water Plan review and revision schedule and highlighted the major elements of the Plans, including:

- Forecast (water and wastewater needs),
- Resource assessments (capacity of those resources to meet these demands),
- Management practices and recommendations (to meet demands, address resource capacity and move toward the Council's vision and goals).

Gail then noted that the municipal and industrial forecasts were already reviewed at the 1st round of eastern Council meetings held earlier in the year (March 2016). Gail then outlined the

agenda for the rest of the meeting, which included a review of the agricultural water demand forecasts, resource assessments, breakout sessions attended by multiple Councils to discuss shared resources, and finally, individual Council meetings.

Note: The individual presentations, given at the Joint Council Meeting session, will be distributed and posted separate from this meeting summary. Therefore, the summaries provided below focus on highlighting the topics covered and capturing the questions and answers reviewed with the meeting participants.

2) 2015-2016 Agricultural Water Demand Forecasts and Updates

Mark Masters, Director of the Georgia Water Planning & Policy Center at Albany State University, provided an update to the Councils on the Agricultural Water Demand Forecasts, including:

- Updated Forecast Results for Current Conditions for Agricultural Crop Water Demand
- Updated Animal Agricultural and Horticultural Water Use Forecast
- Draft Updated 2015-2050 Agricultural Water Demand Forecast

Mark reviewed the current agricultural water use methodology presented at the March Council meetings and noted that water metering data were collected statewide. Mark then continued with the presentation, including some of the following highlights:

- Wetted acreage associated with agricultural irrigation and metering data were used to calculate current demand estimates under different climatic conditions (wet, normal and dry).
- The baseline for acreage values is based on the USDA Census of Agriculture (2012), which provides crop information at the County level. This is consistent with the Round 1 methodology, which used the 2008 USDA Census of Agriculture. The acreage information is incorporated into a 2015 wetted acreage database, which is also linked to a source of water (i.e., surface or groundwater).
- Specific crop information is based on a 2015 crop data layer which was obtained from remote sensing satellite information and information from USDA. The information is then aggregated to specific crop types.
- Crop water use values are estimates of how much water a certain crop needs in a month, in any given wet/normal/dry year. Wet, normal, and dry year estimates are made based on crop, soil type and County. Rotation areas are assigned water use values based on the crop mix percentage in that particular County, while areas of static crops (pecans, orchards, etc.) were assigned water use values specific to those crops. The baseline crop mix was then overlain with wetted acres.
- Crop projections through 2050 are modeled based on multiple data sources, including USDA Projections and the Southeast and Georgia Models (which are based on price projections).

- Agricultural Water Demands in each Council region for 2011 and 2015 were presented side by side for comparison.
 - Groundwater use increased from 2011 to 2015 under the current demand estimates, with the Suwanee-Satilla region showing the largest increase.
 - Surface water use decreased from 2011 to 2015 under the current demand estimates, and acreages irrigated with surface water have also decreased in most of the Council regions. The Upper Oconee region is the only region that does not exhibit this trend due to the number of nurseries in that region.
- The draft 2015 – 2050 forecasted agricultural water demands (under dry year conditions, or 75th percentile) for all 6 of the Council regions were presented.
- Current and forecasted use by basin, water planning region, drainage area (node), County and aquifer will be used to support the resource assessment analyses and the Councils' Plan update process. A peer and stakeholder review of the draft agricultural water demand forecast is forthcoming.

Question: Can you calculate normalized value of gallons per acre based on a Council's crop mix? Is there a standard unit of water use measured across Council regions that is normalized per acre with the recognition that crops have different water usage? This would be similar to municipalities and per capita water use – this doesn't cover region size and this metric might help capture that.

Answer: Mark responded that they have only looked at million gallons per day (MGD) for each of the Council regions. There is pretty good data for gallons per crop, but because the crop mix is so different across Council regions, some type of normalized value is difficult to determine.

Question: How are we considering well to pond irrigation?

Answer: Mark replied that it was considered and incorporated into the irrigated acreages analysis. During the first round of planning, some assumptions were made about well to pond irrigation in terms of source water, but specific studies of well to pond systems in several areas of the Coastal Plain have been made to support this new round of planning. Information learned from those studies are incorporated into the updated irrigated acreage database and will inform the surface water modeling analyses.

Question: Are the data presented based on agricultural production and not processing?

Answer: This is agricultural water usage associated with agricultural production (irrigation) and does not include agricultural processing facilities. Gail Cowie added that the agricultural industry process water is included in industrial water use forecasts.

3) Surface Water Availability Resource Assessment

Dr. Wei Zeng (EPD) presented the updates to the current conditions Surface Water Availability Resource Assessments, including the following topics: Resource Assessment objectives, new information and tools, the Resource Assessment approach, and draft assessment results. Dr. Zeng started the presentation by highlighting that the essence of developing the Surface Water Availability Resource Assessments is to help with answering the following questions:

- How much water is there?
- How much have we used (off-stream needs)?
- How much do we potentially need to leave in the streams (in-stream needs)?
- Do we potentially have an issue meeting both needs?

In highlighting the new information and tools developed since the original water plan was adopted in November 2011, Dr. Zeng noted the following:

- Consumptive water use data through 2013 has been incorporated into the Resource Assessment models;
- Unimpaired flow (UIF) data was extended in the eastern basins through 2013;
- Agricultural metering data has been incorporated;
- Farm ponds have been surveyed in the Flint, Ogeechee, and Suwannee Basins (pond survey is not yet complete);
- Two new nodes have been added to the assessment at the request of the eastern Councils –the Macon2 and Lumber2 nodes;
- ResSim and HEC-5 models were developed to replace older modeling tools; these models are better for capturing farm pond and reservoir operations.

Dr. Zeng noted that the Surface Water Availability Resource Assessments are not designed for evaluating individual permit applications, but rather they are developed for the Councils to support their regional planning work. Dr. Zeng also noted that in identifying potential resource gaps, it is important to understand the concept of 7Q10; he explained how the 7Q10 is calculated and how EPD uses the concept of natural flow (or unimpaired flow) to develop the flow regime.

Dr. Zeng then illustrated how potential gaps are identified (when the modeled flow is below the flow regime), and he described how the potential gap periods can be characterized by event duration (i.e., 8-14 days, 15-30 days, >30 days), magnitude and volume. Shorter duration potential gap periods (such as 1–7 days) tend to be lower in magnitude and more capable of being addressed through management practices, whereas longer duration potential gap periods (such as >30 days) may be associated with extreme drought periods that call for the implementation of more directed drought response measures.

Dr. Zeng showed an example of this potential gap analysis at the Kings Ferry node, including various tables and graphs providing details regarding the potential gap periods.

Dr. Zeng then explained the steps involved in identifying potential gaps in a regulated basin. He then provided example results for a Regulated System, the Savannah River Basin. Dr. Zeng highlighted the following results from the updated Resource Assessment under current conditions:

- Water demands (off-stream needs) and flow regime (flow targets specified by the Corps' Water Control Plan) can be fully met by available water;
- There is reserve storage in the USACE's major storage reservoirs' conservation pools through the most critical drought period;
- Water demand (off-stream needs) and flow regime (in-stream needs) cannot be fully met by available water during drought conditions at the Claxton, Eden, and Kings Ferry nodes. This gap is much larger at Claxton than at Eden and Kings Ferry.
- For Lake Hartwell, the most critical year was 2011 -2012, but even in those years, there were no issues meeting water needs.

Dr. Zeng also noted that the most updated information available from the U.S. Army Corps of Engineers (USACE) is incorporated into the Resource Assessment modeling.

QUESTIONS:
None

4) Groundwater Availability Resource Assessment

The Groundwater Availability Resource Assessment was presented by Dr. Jim Kennedy (EPD) and the content was covered over two sessions, with lunch served in between. Dr. Kennedy started out with some background on the Coastal Plain aquifers.

Dr. Kennedy noted that in 2010-11, EPD prioritized aquifers for analysis based on their use and any potential issues or concerns. Dr. Kennedy indicated that a significant portion of the Resource Assessment focused on aquifers within the Coastal Plain. EPD performed a series of simulations to determine ranges of sustainable yields in different aquifers within the Coastal Plain. Several sustainable yield metrics were developed and guided the sustainable yield evaluation.

For the Floridan Aquifer, the two most significant sustainable yield metrics were the following:

- 1) Drawdown under simulated conditions must be less than 30 feet between pumping locations.
- 2) Drawdown of the groundwater table under simulated conditions cannot decrease the base flow in a surface water body by more than 40%.

Dr. Kennedy went on to review the range of sustainable yield estimates for the Floridan and the other Coastal Plain aquifers, including the Cretaceous aquifer, and he also presented the range of sustainable yield estimates resulting from all of the prioritized Coastal Plain aquifers being evaluated simultaneously.

Dr. Kennedy also presented the range of sustainable yield estimates for the Crystalline Rock Aquifer and indicated that more groundwater is available from this aquifer than is currently being withdrawn. The total estimated availability is approximately 19.8 million gallons per day (MGD) in the Piedmont province. There is a lower permeability of groundwater in the Piedmont, so more is available than we are withdrawing, but it can be difficult to find the fractures and develop the full range of this aquifer's yield.

Question: Are maps available for extensive groundwater recharge areas for the Piedmont?

Answer: In the Piedmont, groundwater recharge areas are based on slope and thickness of soil.

Question: In the assessment of sustainable yield – why was saltwater intrusion left out? This is the opportunity for other Councils to recognize the restrictions coastal users are working under.

Answer: Salt water intrusion was not included in the resource assessment because there are other studies and a specific model for assessing salt water intrusion. EPD has completed several initiatives for addressing saltwater intrusion, and this information can be included in the Regional Water Plan updates.

After a short break for lunch, Dr. Kennedy presented his second set of slides that included results from specific analyses that the Councils requested as part of their recommended management practices from the 2011 Regional Water Plan(s). The analyses were conducted under 3 tasks, as outlined below:

- Task 1: Claxton Node (Altamaha Council)
 - Potential surface water gaps were identified under the 2010 Surface Water Availability Resource Assessment at this location. The groundwater analysis evaluated the potential to utilize groundwater withdrawals from the Floridan aquifer as an alternative to surface water withdrawals in the areas upstream of the Claxton node.
- Task 2: Eden/Kings Ferry Nodes (Coastal Council)
 - There are potential surface water gaps at this location. The analysis evaluated the potential to utilize groundwater withdrawals from the Floridan and Cretaceous aquifers to replace surface water withdrawals in the areas upstream of these nodes.
- Task 3: Cretaceous Aquifer (Middle Ocmulgee Council)
 - This task focused on developing recommendations for long-term monitoring of the Cretaceous aquifer to further evaluate potential impacts of increased groundwater withdrawals in this region.

Some of the specific items highlighted for each task are outlined below:

- Task 1 – The analysis requested by the Altamaha Council was to see if surface water withdrawals could be replaced by groundwater withdrawals from the Floridan aquifer in order to address the potential surface water gaps identified at the Claxton node. Because there are no permitted municipal or industrial surface water withdrawals in this watershed, the analysis focused on replacing agricultural surface water only withdrawals with groundwater withdrawals. The calculated demand for surface water only agricultural parcels in this watershed was approximately 7.4 MGD during the growing season, so simulations focused on an additional 7.4 MGD of groundwater withdrawals from the Floridan aquifer. The additional groundwater withdrawals were simulated at the same locations as the agricultural current surface water withdrawals. The analysis took into account the location of the “Gulf Trough,” which is an area of low transmissivity that resulted in higher simulations of drawdown in the aquifer that exceeded the 30-foot drawdown criteria in some areas. Additional model simulations that excluded withdrawals from the Gulf Trough area did not exceed the sustainable yield criteria. The model simulations indicated that additional groundwater withdrawals from the Floridan aquifer in this watershed area (outside of the Gulf

Trough) could be considered as a strategy to address the potential gaps identified at the Claxton node under the 2010 Resource Assessment.

- Task 2 – This task evaluated the capacity of both the Floridan and Cretaceous aquifers to replace surface water withdrawals in the watersheds upstream of the Eden and Kings Ferry nodes. As there were no permitted municipal or industrial surface water withdrawals in these watersheds, the analysis again focused on surface water withdrawals from agricultural surface water only parcels and evaluating increased groundwater withdrawals from each of the parcel locations. For the analysis in the Eden node watershed, the Cretaceous aquifer was able to accommodate the simulated additional withdrawals. For the analysis in both the Eden and Kings Ferry node watersheds, the Gulf Trough area was again excluded after analysis due to the drawdown exhibited in that area due to low transmissivity. Excluding the Gulf Trough area, additional groundwater withdrawals from the Floridan aquifer were simulated and did not exceed the sustainable yield criteria. A model simulation was also conducted to analyze the additional groundwater withdrawals and corresponding drawdowns from the watersheds of all 3 nodes together (Claxton, Eden, and Kings Ferry), and those simulations indicated that additional groundwater withdrawals from the Floridan aquifer in these areas could be considered as a strategy to address the potential gaps identified at these nodes under the 2010 Resource Assessment.
- Task 3 – This task was developed to provide recommendations for long-term monitoring and evaluation of the Cretaceous aquifer that may be conducted to support an evaluation of potential impacts of increased groundwater withdrawals from this aquifer in the Middle Ocmulgee region. Most of the Cretaceous aquifer groundwater wells are concentrated to the west of the Middle Ocmulgee Council region. Dr. Kennedy noted that useful data for a long-term monitoring program would include USGS monitoring locations (wells and stream gauges). Two USGS wells were identified in the subject area that had long-term water level measurement data (18U001 and 18T001). Water levels in the two USGS wells appear to have declined, with the low point for both wells being observed in 2012. Since that time, water levels appear to have stabilized. It was noted that seasonal variations in pumping and climate variations such as drought can affect groundwater levels, and it is important to gather climate data as well as pumping histories to disaggregate impacts of increased pumping from other factors. Dr. Kennedy compared water levels observed in the two USGS wells to the Palmer Drought Severity Index (PDSI) to see if there were climatic impacts to the recorded water level measurements in the two USGS wells. It is going to take some time to see how water levels tend overtime. Additionally, the Cretaceous aquifer in the northern part of the region outcrops and is in potential contact with surface water in this area, so additional stream flow data may also be useful in assessing Cretaceous aquifer water levels.

Questions: What caused the Gulf Trough?

Answer: It is either an area in the limestone that is filled with clay and/or other low-permeability materials. It is unknown whether the filled area is structural versus depositional, but it is definitely an area of low water transmissivity.

Question: How do you take into account the increasing frequency and severity of droughts? Will the new norm be more extreme drought?

Answer: I am not ready to say that the new norm is extreme drought. We do know that in 2007 and 2012 there was extreme drought and response in some of the observed aquifer levels. We

need to continue to monitor the groundwater levels and the USGS is continuing to monitor the levels.

Question: Where is the Gulf Trough?

Answer: It extends all the way into Florida and runs across most of Georgia along a southwest to northeast line. It effects southwest and south-central Georgia, but the exact location of the Gulf Trough is not fully defined.

Question: What is the width of the Gulf Trough?

Answer: The width varies and, at its widest location, it is more than 10 miles wide.

5) Water Management Plan Assimilative Capacity

Dr. Elizabeth Booth (EPD) presented the updated Surface Water Quality/Assimilative Capacity Resource Assessment information under current conditions. Dr. Booth highlighted that surface water quality information is meant to inform management practices about wastewater management and non-point source pollution. Dr. Booth also noted that EPA has asked all the states to establish numeric nutrient criteria.

Additional highlights of Dr. Booth's presentation included:

- A third of Georgia's waters meet current water quality standards. Impaired streams are listed for a variety of reasons based upon the biological, chemical, and/or physical integrity of the stream. Half of the impaired waters in the State are due to pathogens (e.g., fecal coliform). These pathogens are present primarily due to water runoff from the land, not from wastewater treatment facilities.
- A variety of models are used to assess the pollutant loading to and assimilative capacity of the water bodies, including dissolved oxygen sag (DOSAG) models and hydrodynamic models used to analyze lakes and estuaries.
- Available data from USGS and EPD, along with data from wastewater treatment plants, was used for model calibration (2007 data were used in the 2010 Resource Assessment, and 2014 data has been used for the updates).
- Dr. Booth's dynamic water quality modeling also captures modeled water quantities, precipitation, and other watershed inputs (e.g., nutrients from septic tanks, chicken houses, runoff from various land areas, etc.).
- Due to a 2011 fish kill, a watershed model for the Ogeechee River was developed, which resulted in the first estuary model for Ossabaw Sound. Additional models were developed for the Lower Altamaha Basin and Sound, Brunswick Harbor, and St. Andrew Sound. Funding was also used to support development of a Tennessee River Basin model.
- For the Resource Assessment analysis, an assumption was made that all wastewater treatment plants have a permitted ammonia level. In reality, some of the plants do not have a permitted ammonia level.

- In general, north Georgia streams exhibit higher assimilative capacity than those in south Georgia, where the topography results in slow moving water, which may contribute to naturally lower DO levels.
- The Resource Assessment updates also incorporate permitted wastewater flows; it is EPD's responsibility to ensure that modeled discharges meet water quality standards.
- Stream 7Q10 values are incorporated into the Resource Assessment evaluations. A small wastewater treatment plant located on top of a hill might have a 7Q10 of zero, with a required ammonia level of 4 mg/l. To meet this requirement, advanced treatment may be necessary, but may also be prohibitively expensive. In these types of instances, land application systems should be included as a consideration for best management practices.
- According to basin rainfall analysis, wet year results indicate greater impact from non-point sources, whereas dry year results are more strongly impacted by point source.
- Heat maps completed as part of the Resource Assessment help to identify areas that may exhibit higher nutrient loads (phosphorus or nitrogen) and BOD levels.
- In reviewing nutrient heat maps for wet and dry years, if a hot spot is located on both maps, it could be due to a point source, or might be impacted by the assumed nutrient levels. Hot spots only showing on wet year maps are the result of a non-point source issue (e.g., agricultural or urban).
- There are nutrient limits being developed for the Upper Oconee region to include chlorophyll levels for Lakes Oconee and Sinclair. This may have an impact on treatment plants that discharge upstream of those lakes, particular those that do not currently treat for nutrients.
- The Brunswick Harbor is noteworthy, due in part to the discharge practices of a large paper mill facility located there. The mill only discharges half way through the high tide, which means that there is always clean water on the head of that discharge.
- The EPA has approved Georgia's 2014 list of 303(d) impaired waters, along with a 5-R document representing a restoration plan for the Savannah Harbor. The river and harbor groups worked together to set a discharge limit, and for the first time in 10 years, EPD will be able to accept applications for permits that discharge into the Savannah River.

Questions: None

6) Joint Council Breakout Session A: Discussion of Resource Assessments and Joint Topics for the Altamaha, Middle Ocmulgee, and Upper Oconee Councils, along with members of the Suwannee-Satilla Council

Facilitators: Danielle Honour (CDM Smith), Dale Jones (Jacobs), and Ted Hendrickx (EPD)

The Planning Contractors (PCs) from CDM Smith and Jacobs opened the meeting by soliciting feedback regarding the joint session. A Council member requested that handouts be provided in advance of the meeting to allow for Council members' review of the material prior to their arrival at the meeting.

The PCs next invited the Chairs from each Council to share their views regarding the major resource challenges that their region is facing, drawing from the 2011 Plan in regard to the Resource Assessment results, focusing on potential resource gaps and their Council's vision and goals for their region.

Mr. Ed Jeffords, Chair, Altamaha Regional Water Planning Council

Chairman Jeffords expressed his goals of protecting water resources and wisely managing them for the health of the basin and natural systems. He would like to see the region's economy supported to help retain the younger generations in the region. He stated that not much has changed within the region over the past five years. It is largely an agricultural region that is a rich rural area where we want to continue to enhance quality of life.

Demands have not changed significantly; there are no current gaps in groundwater, and they wish to continue to protect the Floridan aquifer. During the previous planning process, the region experienced drought conditions such that you could walk across the Altamaha River. There are five planning nodes in the Altamaha region and the water quality is in good shape. Chairman Jeffords' recommendation is to continue with and fund regional water planning efforts, and to make sure adequate funding is provided for ongoing data collection. The Chairman would like to see more funding from the State to allow for the development of tools and studies that assist with water management decisions.

Ms. Pat Graham, Vice-Chair, Upper Oconee Regional Water Planning Council

Vice-Chair Graham recognized Melvin Davis, Chairman of the Council, who was not able to attend. Many Council members are still active, though some were also not able to attend. The Upper Oconee is a very diverse region – urbanized areas to the north, with rural areas in the south. There is a gap in water supply in the upper urban area, but not in the middle or lower regions. Major issues identified in the 2011 Plan (and reflected in the Upper Oconee Region fact sheet distributed at the meeting) currently remain issues to be addressed. Vice-Chair Graham is pleased to see the refinement of the data from the farming community as it will allow for better calibration of the regional plan. The region already has a good group of management practices that only require fine-tuning. There are expected to be future water supply shortages in urban areas as localized growth demands are expected to exceed supply. However, the Council anticipates that the gap would now be expected to be smaller due to revised population projections. The assimilative capacity in the lower Oconee River was also noted as a challenge due to low dissolved oxygen levels.

Mr. Ben Copeland, Vice-Chair, Middle Ocmulgee Regional Water Planning Council

Vice-Chair Copeland pointed out that this Council straddles the fall line, and there are more abundant resources south of the fall line. He reiterated the importance of being good stewards of those resources. Water quality continues to be a major challenge in this region.

The Macon 2 planning node is of particular interest to this Council. There are impaired streams in swampy areas that have fecal coliform issues, possibly related to wildlife.

Mr. Scott Downing, Chair, Suwannee-Satilla Regional Water Planning Council

Chairman Downing pointed out that there are no rivers that flow into this region, however, there are 5 rivers that all originate within the region. During low flow conditions, these systems can run dry (the Alapaha River regularly goes dry and has low dissolved oxygen on a regular basis). There is zero industrial surface water use, with the exception of one permit that has not drawn any water in 15 years. Agriculture is the primary producer and economic driver in the region. The majority of “industrial” use is related to agricultural processing. There are also no withdrawals related to power production.

This planning process is very important, but the Council has experienced a decline in the number of Council member who are actively participating in the process. The Chairman hopes that with the next round of Council appointments, it can increase the number of active Council members so that business can be conducted. The groundwater aquifers are an important resource, but also an economic development opportunity. There is an opportunity for business to come to Georgia and to the Suwannee-Satilla region. Good data is necessary for the forecast updates to ensure confidence as the Council makes decisions and develops their plan. It is easy to slip back in to the mindset that “the data isn’t correct,” and therefore the State must continue conducting research. The legislators on our Council need to stay in contact with the State to properly communicate the importance of this exercise.

Chairman Downing also discussed interactions with Florida and mentioned that there are small communities in Florida (similar to those in Georgia) that subsist on “spring tourism.” However, the State of Florida has a different understanding with their water management districts, with some problems that may be related to the growth of Jacksonville. He acknowledged that this is a complex situation, in part due to ongoing litigation between the two states.

Mr. Tim Thoms, Metro North Georgia Water Planning District

Mr. Thoms stated that he is glad to be of any help and commended the Councils for their actions. He appreciates the spirit of collaboration shown by the Councils in inviting the Metro North Georgia Water Planning District to participate in their Plan update process.

Q&A on Morning Session Technical Information

Agriculture Demand Estimates

Mark Masters (Director of the Georgia Water Planning & Policy Center at Albany State University) was present during this part of the Q&A to respond to comments and questions related to the agricultural demand estimates.

Question/Comment: A Council member expressed concern with how the swine number is broken down, and if it includes swine feeder pigs as well. He stated that pigs are born in the

area, but are then transported outside of the Suwannee-Satilla and Altamaha regions to “grow out”; therefore, the water demands associated with swine in these areas should be less than what is currently projected. A request was made to double check the swine numbers to properly account for feeder pigs.

Answer: Mark Masters stated that he would look into this concern and follow up with the affected Councils.

Question/Comment: How did the agricultural forecasts handle nursery and horticultural water use?

Answer: Daily water use by horticultural nurseries was based on information from the USDA Farm Gate survey and green industries information. Sod farms are not included in horticultural water use estimates but are included in the crop/irrigated acres estimates.

Following the Q&A for agricultural demand estimates, Mr. Gary Hawkins, an extension specialist with the University of Georgia stated that he would like to work with the Councils to implement management practices identified in their Plans and offered to be available to any Councils who had an interest.

Question/Comment: A request was made to have a summary of the information shared by Mr. Hawkins sent out to Council Members who couldn’t attend the meeting.

Question/Comment: A member of the public stated it would be a good idea for WaterSmart programs to restart. The Macon Water Authority would be interested in assisting with that. Mr. Hawkins noted that he is working with several agricultural and urban agencies to restart programs, such as WaterSmart, that have stalled.

Surface Water

Brian Bandy (ARCADIS) was present during this part of the Q&A to respond to comments and questions related to the Surface Water Availability Resource Assessment updates.

Question/Comment: What is the difference in the two Macon nodes?

Answer: The Macon2 node enables the calculation and inclusion of the Macon NPDES wastewater discharge to be moved from the Lumber City node upstream to the Macon2 node.

Question/Comment: Please explain the storage capacity of the lakes.

Answer: The storage capacity of reservoirs were included in the Resource Assessment modeling work. The model simulations accounted for water inflow, water being stored and water being released from the lakes under the various reservoir operations.

Question/Comment: Can we use more lakes [reservoirs] for withdrawals?

Answer: Specific scenarios to account for additional withdrawal from reservoirs were not included in the Resource Assessment updates. A representative of Georgia Power also

noted that there is no excess capacity in their reservoirs. As the purpose of the reservoirs are for hydropower generation, withdrawals are permitted on a case-by-case basis. The reservoirs must meet federally-mandated surface water flow targets and hydropower needs under the federal license issued for their operation.

Question/Comment: Does the model include evaporation from the reservoirs?

Answer: Yes.

Groundwater

Lee Wiseman (CDM Smith) was present during this part of the Q&A to respond to comments and questions related to the Groundwater Availability Resource Assessment updates.

Question/Comment: Was the groundwater pumping that goes on in South Carolina and Florida included in the model and is it reflected in the sustainable yield evaluation?

Answer: Yes, baseline pumping information from South Carolina and Florida were included in the groundwater models at the time they were developed.

Question/Comment: What is status of South Carolina's plan development?

Answer: South Carolina is currently in the process of developing a state water plan.

Question/Comment: What are the criteria used for salt water intrusion?

Answer: There were no criteria used for saltwater intrusion for the model results presented earlier in the day, but sustainable yield criteria such as drawdown were used. The drawdown simulations from the model results were compared to the cone of depression, and those simulations did not demonstrate any impacts that would reach Hilton Head under the current modeling scenarios.

Question/Comment: There is a concern that saltwater intrusion is not being discussed at today's meeting; a cone of depression acts like a vacuum and speeds up the infiltration rate. It has now gone from 90 miles wide to 120 and is changing the flow of water.

Answer: Dr. Kennedy's work does include this, but he did not specifically discuss it today. Additional information can be provided as follow up to the Councils.

Water Quality

Ted Hendrickx (EPD) and Brian Watson (TetraTech) were present during this part of the Q&A to respond to comments and questions related to the Water Quality/Assimilative Capacity Resource Assessment.

Question/Comment: Everything flows into to the estuaries – between the estuary and the ocean, there is a large exchange of water. In fact, the second highest tide in North America is experienced in coastal Georgia. Fresh water inputs are needed to maintain the estuaries. The

estuaries along Georgia's coastline are the nurseries for fisheries for much of the Atlantic. What happens upstream has great impacts to these downstream systems.

Question/Comment: A Council member questioned what the red lines shown on the model results maps mean.

Answer: These maps show the results of the steady state DOSAG and GA Estuary models using a color-coded system. The streams with red lines correspond to those for which, under modeled conditions, there is no available assimilative capacity with respect to dissolved oxygen. The modeled dissolved oxygen level is compared to the dissolved oxygen water quality standard in that location to determine the remaining assimilative capacity. If the minimum dissolved oxygen water quality standard in that stream is 5.0 mg/L, then a "Very Good" (blue) rating is given to those portions with dissolved oxygen levels of 6.0 mg/L or greater, and a "None or Exceeded" (red) rating is given to those portions with dissolved oxygen levels less than 5.0 mg/L.

Question/Comment: How is dissolved oxygen modeling handled?

Answer: Dissolved oxygen is modeled using maximum permitted flows from wastewater treatment facilities and the flow condition used is 7Q10 in order to evaluate the most conservative modeling condition.

Breakout Session A adjourned at approximately 3:00 PM.

7) Joint Council Breakout Session B (This session ran concurrently with Breakout Session A): Discussion of Resource Assessments and Joint Topics for the Coastal Georgia and Savannah-Upper Ogeechee Councils, as well as members of the Suwannee-Satilla Council

Facilitators: Rick Brown (CDM Smith) and Jeff Larson (EPD)

Rick Brown opened the session and welcomed everyone. He emphasized that this is intended to be an interactive session and we will start out first by asking to hear a summary from each of the regions/Councils. We have asked the Council Chairs/members to highlight their regions, including a summary of the issues and drivers specific to their region/Councils.

Coastal Georgia Council Chairman Beniy Thompson provided the following comments:

- Greetings on behalf of our Council members, water stakeholders, and citizens in our Region
- While each of our regions is unique, the Coastal Region might provide the most diversity of all the areas in the Statewide planning process
 - We have a multitude of different types of users and uses: large and small municipal systems; agriculture; water reliant industry; energy; commercial fishing; tourism; and Armed Forces. In addition, global trade associated with highways and the major

- seaport of Savannah are vital economic drivers and the Savannah Harbor deepening will require continued stewardship and wise management of this complex system.
- We have five River systems that flow through our region: the Savannah, Ogeechee, Altamaha, Satilla and St. Marys.
 - We have the Atlantic Ocean – and the marshes that are critical to so many natural and manmade activities. Additionally, the flow from the 5 major rivers I just described create a unique estuarine environment as the freshwater and saltwater combine. This environment depends on stable upstream flows to support this ecosystem.
 - In addition, we have a situation similar to those regions dealing with ACT/ACF issues – we have a water scarcity issue, or at the very least, a water management issue: saltwater intrusion in the Savannah/Hilton Head area.
 - In the context of these diverse water uses and water management/scarcity concerns, our Council has been plugging away.
 - Thankfully, many of our Council members and supporting entities have been working on these issues for many years, some for many decades, and have provided great support for our planning process.
 - The efforts of our Council at the beginning of this process yielded a couple of interesting points:
 - First, our Mission statement – “The Coastal Georgia Regional Water Planning Council seeks to conserve and manage our water resources in order to sustain and enhance our unique coastal environment and economy of Coastal Georgia.” That Mission statement, along with our Goals, reflect our diversity and the importance of the natural system to our Region.
 - Second, the concern that all of us have shared about our population projections, due to our fast growing region and the water users (e.g., tourists, soldiers, students) who may be difficult to track.
 - After working through the population projections and the resource assessments, our Council identified a number of resource gaps that our Plan addresses.
 - As the Council works through the Plan Update, we look forward to updated information on population projections and resource assessments to help us continue to provide leadership and assistance to our region’s stakeholders.

Savannah-Upper Ogeechee Chairman Ron Cross provided the following comments in regards to their region:

- We are very fortunate and blessed to have such a robust water resource system given the lake/dam systems in our region(Hartwell, Russell, etc.). Our primary concern has been to take care of water quality going downstream.
- One item of note is that Columbia County has spent millions of dollars to treat water, including approximately \$30 million over 5 years to update their treatment plants.
- In our region it is important to work with the Corps of Engineers, especially during droughts, and balancing the needs of the environment, public supply and working with our neighboring Councils/region.

- In our region, multiple facilities/authorities have received the platinum award from the Georgia Association of Water Professionals (GAWP) in recent years.

Chairman Cross then recognized Bray Boardman and thanked him for the great work he's been leading under the Clean Water Fund and Chairman Cross asked Mr. Boardman if he had any comments to add.

Mr. Boardman credited the great work to the 5 major water utilities and 2 states working together and investing in buffers for the entire Savannah River basin. The net result will be a boost to economic development for the region by allowing for the purchase of land for buffers, to put them in permanent conservation easements, and to implement best management practices.

Chairman Cross asked why Coastal Council's energy water use is 56 percent. The answer is that most of the water is used for "single-pass cooling," meaning that a majority of it is returned and it is not consumptive use. The numbers appear skewed for this reason.

Rick Brown (CDM Smith) summarized some items for the Suwannee – Satilla Council/region.

Their Council boundary is unique in comparison to other Councils because their watershed does not extend north above the Georgia fall line. Consequently, the size of their watersheds are smaller and they are not blessed with as many surface water resources. Additionally, this area has lower gradient streams and areas of high natural nutrient loads which result in lower dissolved oxygen in those streams. Groundwater is extremely important to the region because of the more limited surface water availability. The Gulf Trough extends through this region and that geologic structure limits groundwater availability in the Counties that it passes through and in these areas surface water use is higher, but as mentioned earlier, surface water availability is somewhat limited given the smaller size of the watershed within the region.

Lindsay Thomas, a Council member from the Altamaha region stated that it was fitting to be participating with the Coastal Council/region and reported out on the following specific to the Altamaha Council/region:

- The Altamaha River drains a quarter of the State, and has been called the "Little Amazon." The Altamaha region is fortunate to have such a strong water source, with the exception of a few gaps, such as low flow issues.
- The biggest concerns for the Altamaha region are maintaining their river basin and mitigating the downstream impacts to the life of the salt marsh, which is critical to barrier islands.
- He mentioned some concern about the fact that 46 percent of the Regions' acreage is in agricultural production, with timberland being cleared for agricultural production.
- The Altamaha Council also has concerns about fish and wildlife resources and their sustainability.

Mr. Thomas noted that everyone on the Council wants to be good stewards. Mr. Thomas indicated that he had the pleasure of representing Georgia's coast for 10-years in the U.S.

Congress and learned a great deal about the natural water resources of Georgia, including that the life of the salt marsh is very important to the ecosystem. He stated that if you lose the Spartina (saltmarsh grasses), you lose the marsh estuarine systems. Without the grasses, the marsh will turn into a sound. He reiterated that while they focus on maintaining the river basin itself, they understand that the Altamaha is important to the coastal area.

A Council member noted that it's important to continue the development of agriculture while balancing it with the water resources we have.

Rick thanked the Chairs/Council members for their introductory remarks and then posed the following question and solicited feedback: **"What did you learn from the Resource Assessment discussions earlier today?"**

Question – Can someone provide more information regarding the Red and Yellow Zones and the groundwater withdrawal permit reductions process in the Coastal Georgia area?

Answer - This is a multi-decade discussion and goes back to the Coastal Sound Science Initiative (CSSI). The discussion today by Dr. Kennedy focused of the Floridan aquifer from a much broader area (versus Savannah/Hilton Head Island area) and the CSSI developed a separate modeling tool and Dr. Kennedy's presentation today did not focus on the CSSI modeling tool. This modeling tool was developed to evaluate/assess saltwater intrusion in Savannah/Hilton Head Island area. The Red and Yellow Zones were designated in response to challenges associated with saltwater intrusion. The Red Zone includes Chatham and a portion of Effingham County and under this designation they are not allowed to have new groundwater withdrawals. The Yellow Zone includes Liberty and Bryan Counties and under this designation there would be limited groundwater withdrawal increases. More recently, EPD issued a moratorium on additional groundwater permits in both areas and has also implemented a reduction in groundwater permit limits for existing permit holders.

Rick wrapped up this topic by stating that for Coastal Georgia, their Plan will need to now address the impact of the reductions in groundwater permit limits as part of their gap analysis (the gap analysis will compare the new forecasts with the availability established by the permit reductions adopted by EPD).

Comment - Tom Wiedmeier commented that the resource assessment for water quantity showed there are no gaps, because the resources never reached the bottom of the conservation pool. Mr. Wiedmeier expressed concern about allowing reservoir levels to drop into the conservation pool.

Discussion – Dr. Booth noted that the Corps is currently evaluating potential changes to drought plan for the reservoir projects in the Savannah River basin. Under the Savannah River Basin Comprehensive Study, the Corps is evaluating six alternatives. There's a

workshop coming up in a month to month and a half focused on discussing these alternatives.

Question – Ron Cross asked about flow rates from Clarks Hill Dam.

Answer – Dr. Booth responded that the flow rates are approximately 3,600 cubic feet per second (cfs) in the summer time, and 3,200 cfs in winter.

Question – Ron Cross stated that during severe drought, the discharge was 3,100 cfs. He asked if the environmental needs of the Coastal region could be sustained with 3,100 cfs.

Answer – Dr. Booth responded yes, but only in winter. The Corps is looking at river levels at docks, water quality, salinity, and dissolved oxygen impacts in the harbor, intakes, discharges, etc.

Question – Ron Cross asked whether that analysis would also include contributions from tributaries?

Answer – Dr. Booth responded that the analysis takes into account 7Q10 and critical flows from the last 15 years. She also mentioned that The Nature Conservancy (TNC) has worked with EPD on ecology flows. TNC worked with EPD to identify lower consistent flows in the Harbor to protect some pulses in the spring that are critical to spawning.

Rick Brown added that there is additional complexity, not just because of flow issues, but with the potential Harbor deepening and the potential for increased reliance on surface water. A low flow/high tide condition could cause a greater vulnerability (salt water wedge) to the water supply intake for the City of Savannah's surface water plant.

Comment – Tom Wiedmeier – I want to revisit the discussion on conservation pools. The range of flow rates through Clarks Hill Dam is huge. The range in conservation pool is 25 to 30 feet. This drop causes issues beyond water availability - additional concerns for boat safety, recreational use, and economic development.

Comment – James Thomas – On a micro level, building wastewater treatment facilities can be costly, in Hinesville/Liberty County, it came to \$52 million in total cost. That affects the economy all along the coast. Coastal Georgia has the most pristine coast in the U.S., and it needs to be protected. Coastal counties have to buy water from other counties so they can continue to protect the coast. There are additional concerns over potential growth with the opening of the newly enlarged Panama Canal, new industry, and the Harbor deepening.

Question – Why did you use an Eden node in the surface water resource assessment?

Answer – Dr. Zeng (EPD) indicated that the resource assessment grouped surface water into 2 categories: 1) regulated and 2) unregulated. For unregulated areas, long-term stream gauges such as Eden were used to determine water availability.

Dr. Zeng also spoke to the question about conservations pools and their effect on flow regime. He stated that it is important to meet the needs of the waterways upstream and downstream, especially during critical droughts. His group has started looking at possible other flow regimes. The current state policy is an interim policy that has been in place since 2001 and serves as the default.

Rick added that we have heard some perspectives that the current minimum flows may not always provide enough water for all ecosystem functions. There is a need to balance instream and offstream uses.

Comment – The northern part of the state has small watersheds, but good geology for reservoirs. However, the south doesn't have any reservoirs beyond what is naturally in the watersheds (e.g. wetlands, etc.). Science tells us what we've got to do, but it all comes back to managing our water below the fall line. A lot of water passes through without being captured. There was enough water that ran down the Altamaha to provide for the state for a decade, but it all left the watershed. Low flow systems have a better chance if they have water in them.

Question – On the Canoochee River, regarding the Claxton node low flow, is there a planning process for making the determination on replacing agricultural surface water withdrawals with well withdrawals (i.e., replacing farm ponds)?

Answer – Rick noted that the information presented by Dr. Kennedy was provided as a resource to the Councils, but EPD is not planning to do anything at this time. One possible management practice is using additional ground water and less surface water at planning nodes with potential gaps. In Council Meeting 3, we will look at strategies to address gaps. For example, one scenario could look at farm ponds and their potential use of surface water and groundwater. Dr. Kennedy added that we cannot pump enough water to cover the replacement of surface water. The study was done to assess basic feasibility.

Question - What is the sustainable yield for the aquifer? The specific concern is about Florida and South Carolina's use and their impact. Are there any ongoing or future strategies for tri-state planning?

Answer – Rick mentioned that a few stakeholders from Florida and South Carolina attended meetings during Round 1 planning. Dr. Kennedy added that the model developed in 2010 to look at saltwater intrusion covered an area from South Carolina to Georgia to Florida. Florida (St. Johns Water Management District) is currently developing a North Florida-Southeast Georgia (NFSEG) model looking specifically at the Floridan aquifer in south Georgia and north Florida. All three states are not working together in one effort, but they are working together, separately.

Question - Is there a gap?

Answer – Dr. Kennedy responded that it depends on how you define gap and the time frame (i.e., if you are using the criteria of salt water reaching wells in Savannah, not now, but there could be in 100-120 years).

Question – Regarding groundwater, during high agricultural use of the Floridan aquifer, though not hydrologically connected, is the surficial aquifer sometimes being drawn down?

Answer – Dr. Kennedy indicated that pumping of the Floridan aquifer will draw down the surficial aquifer, but only minimally.

Question – Is it feasible to pump water into the ground for storage?

Answer – Dr. Kennedy mentioned that in Georgia, it is not currently being done. Aquifer storage and recovery was tested in Baker County, but the test well results were not favorable in that particular area.

Rick thanked everyone for the discussion and then posed the following question: **“What additional questions have come to mind regarding the Resource Assessments?”**

Question - James Thomas asked about the process of recalculation of 7Q10 for tributaries and rivers in the Coastal region.

Answer – Dr. Booth discussed the process for calculation of 7Q10. Dr. Booth also turned her remarks toward a discussion of EPD efforts to address nutrients, noting that EPD will be studying lakes and estuaries first. Under a \$150,000 EPA grant, EPD will work with the UGA Marine Extension group at Skidaway and Sapelo Islands and the EPA Athens lab. UGA will be developing a model, under a study plan that will start in 2017, and will work with the DNR Coastal Resources Division, EPD, and EPA on that effort. Dr. Booth noted that UGA's work is something that started with Mr. Thomas's Coastal seed grant that has evolved into this effort.

Dr. Booth also mentioned her related analysis of ammonia levels at treatment plants throughout the state. Based on her analysis, about a third of discharges would likely need to make plant upgrades or seek other options to achieve ammonia targets.

Question – What is the time frame on nutrient criteria being established?

Answer – Dr. Booth noted it is challenging identifying the appropriate biological response, which takes time to observe. The upstream reaches of the Altamaha flows very quickly but then when those flows hit the estuary, it takes 21 to 28 days to totally leave the system. There are a number of indicating factors that require prudence to determine. She thinks a year to collect data and to calibrate. Then, they will begin to develop scenarios.

Rick noted that Danny Johnson from Metro North Georgia Regional Water Planning District was attending the session and asked Danny if he had any comments.

Danny Johnson said hello, and expressed his appreciation of being able to attend and participate in the Joint Council Meeting and indicated that he wanted to help in any way they can and offered to be available for collaboration and coordination.

Comment – Council Member Braye Boardman (SUO) stated that the Savannah Basin has concern for downstream activities and the reverberation back up the river. They need to look at whole dataset, rather than breaking into councils. He requested that analysis be done while looking at the whole basin.

Comment - Dr. Gary Hawkins (UGA Extension Service) is looking to get management practices and implementation plans for non-point source items out to County extension agents in order to push implementation at the County level. He encouraged people to work with their County 4H agent. This effort would help take the management practices and get them into implementation

Breakout Session B adjourned at approximately 3:00 PM.

8) Individual Council meetings:

The Councils then broke out into their individual Council meeting sessions. Summaries for those meetings have been prepared as separate documents.