

To: Upper Flint Water Planning Council

From: Kristin Rowles, GWPPC, Robert Osborne, Stephen Simpson, Black & Veatch

cc: Tim Cash, Assistant Branch Chief, GA EPD

Subject: Meeting Summary: Council Meeting 4 on November 20, 2009

The council meeting was held on November 20, 2009 at the South Georgia Technical College in Americus. The list of attendees is attached. In addition to these minutes, all the presentations (slides) discussed in this meeting will be posted on the Upper Flint Water Planning Council web portal (<http://www.upperflint.org/>).

Invocation, Welcome, and Introductions

Council member Jim Reid welcomed the Council to South Georgia Technical College and provided the invocation. Council Chair Donald Chase welcomed the council and reminded the Council of the importance of their efforts.

Kristin reviewed the agenda and noted that she would like to move the item on planning for joint meetings forward on the agenda so that Donald Chase, who had to leave early, could participate in that part of the meeting. There were no comments, and the agenda was approved.

Council Meeting 3 Re-cap and Meeting Summary Review

Kristin Rowles summarized Council Meeting 3, which included:

- Review of draft agricultural water demand forecast (comments still welcome, formed subcommittee)
- Approval of MOA Documents
- Discussion of vision statement
- Review of Public Involvement Plan (revised for consideration at Council Meeting 4)
- Introduction to resource assessments and planning guidance
- Review of municipal and industrial water demand forecast methodology
- Discussion of management practices and upcoming joint council meetings
- Presentation by Metro District

Upper Flint Water Planning Council
Council Meeting 3
Meeting Date: November 20, 2009

B&V Project 164139
November 23, 2009

Next, Kristin reviewed the evaluation results from Council Meeting 3. She said most respondents (94%) felt that the meeting provided ample explanation of the goals and timeframe of the regional water planning process and helped them understand their roles and responsibilities as council members. 50% of the respondents thought that Council Meeting 3 was extremely useful, and 50% of the respondents found it to be somewhat useful. Kristin noted that most respondents (87%) have used the regional council web site. A detailed breakdown of the results is included in the meeting material section of the regional website.

Kristin asked if members had any comments or edits to Council Meeting 3 Meeting Summary. There were no comments. With no objections, the Council Meeting 3 Meeting Summary was approved by unanimous consensus.

Vision and Goals

The Council discussed vision and goals. Cliff Arnett, the chair of the vision subcommittee, thanked the sub-committee members: Randy Starling, Brant Keller, Frank Keller, Buddy Leger, and Jim Reid. The vision subcommittee proposed the following vision statement:

The Upper Flint Regional Water Council's purpose is to provide guidance, leadership and education on water resource utilization within the region. Through cooperation among stakeholders, this plan will assist the Council's efforts to manage the region's water resources in a sustainable manner, be supportive of public health and natural ecosystems, support the State's economy and enhance the quality of life for its citizens.

Kristin asked the Council Members if they had any comments or concerns. Cliff Arnett made a motion to accept the vision statement. The motion was approved unanimously.

Next, Kristin said that the Council would need to adopt a set of goals in addition to the vision statement. She provided examples of goals adopted by the Lower Flint Ochlockonee and Middle Chattahoochee Councils.

The Lower Flint-Ochlockonee Council goals are as follows:

1. Ensure access to water resources for existing and future water users in the Lower Flint Ochlockonee region.
2. Sustain the region's aquifers, most particularly the Floridan aquifer, in a healthy condition that will continue to support the natural systems and economic activities of the Lower Flint Ochlockonee region.

Upper Flint Water Planning Council
Council Meeting 3
Meeting Date: November 20, 2009

B&V Project 164139
November 23, 2009

3. Maintain the production agriculture based economy of the Lower Flint Ochlockonee region.
4. Support sustainable economic growth in the region.

The Middle Chattahoochee Planning Council goals are as follows:

- **Political:** The plan will provide the technical basis to help resolve the issues pertaining to water resources management and competing interests.
- **Uncertainties:** The plan will provide guidance for effective policies and appropriate actions during drought, economic uncertainty, regulatory or political influences, and affects of climate variability.
- **River System:** The Apalachicola-Chattahoochee-Flint (ACF) river systems are unique asset within the region. The management of the rivers and their uses (hydropower, navigation, water quality, water supply, flood control, fish and wildlife, recreation and cooling water for nuclear and coal fired power plants) are vital to the region. The plan may recommend adjustments to the management directives and uses of the river systems in order to achieve a balance of future water requirements within the region.
- **Quantity and Quality:** The plan will establish the necessary goals to achieve water quality and quantity throughout the Middle Chattahoochee basin.
- **Land Use Changes:** The plan will acknowledge the increasing tax value of land and resulting trends: increasing urbanization, fewer natural forests, and decreasing agricultural land. However the plan will seek to encourage agricultural land and forest land conservation by providing for their water requirements.
- **Water Balance:** The plan will provide a better understanding of water balance and consumptive use and clearly define returns to surface water, the need for storage, and provide guidance for the increasing trend for groundwater usage.
- **Population:** The plan will address the water needs for an increasing [resident] population as well the increased transient population at such locations as Fort Benning.
- **Conservation / Green:** The plan will encourage forest, agriculture and open land and habitat preservation. It will also encourage alternative energy sources, water conservation, and increased protection of habitat and natural resources.

Kristin suggested using these goals as a starting point for the vision subcommittee to work on the goals and be able to present the goals at the next Council Meeting. Council

Upper Flint Water Planning Council
Council Meeting 3
Meeting Date: November 20, 2009

B&V Project 164139
November 23, 2009

Vice-Chair Dick Morrow said he preferred the goals from the Middle Chattahoochee Council because they offered more specificity. Chairman Chase liked the Middle Chattahoochee goals as well, but noted that agricultural areas were not in decline in this region as was noted in the Middle Chattahoochee goals. Beth English suggested that the water balance item specifically include different sectors such as power, agriculture, and industry. Council member Cliff Arnett noted he needed more input from the agricultural sector on what to agricultural issues to address in the goals. Chairman Chase said he thought this region had a greater mix among water users than in the Lower Flint Ochlockonee region, and the goals needed to reflect this balance of users. Chairman Chase said that the importance of agriculture in the southern tier of this region should be recognized, but that the mix of uses throughout the region should also be recognized. Cliff Arnett asked if water quality was a concern for the Council, and Vice Chairman Morrow and Member Raines Jordan said that water quality is an important goal.

The subcommittee will draft a set of goals for the regional water development and conservation plan. The Council will consider the goals for adoption at its next meeting.

Planning for Joint Meetings

Kristin reminded the council that the objective of the six upcoming joint council meetings is to provide Council members with a working knowledge of the resource assessments, both the process and the results. The working knowledge will facilitate understanding of the resource assessments and allow planning to move forward with gap analysis and management practices selection.

Next, Kristin reviewed the agenda for the joint council meetings:

- Welcome and Charge to Meeting Participants (15-30 minutes)
- Resource Assessment Presentation and Discussion: Ground Water (~90 minutes), Surface Water Quantity (~90 minutes) and Surface Water Quality (~100 minutes)
 - Overview of Methodology and Assumptions
 - Results Specific to the Basin; Crosses planning council boundaries
- Future steps and wrap up (20-45 minutes)
- Technical Discussions Open House (stations for each resource assessment) (60-120 minutes)

Kristin then reviewed both the watersheds and groundwater maps to help Council Members decide which of the joint meetings they want to attend. Kristin reminded the Council Members that Council Meeting 5 was going to be held in March. Cliff Arnett asked what the council expects for the attendees to do at the joint meetings. Kristin noted that attendees should be able to be able to report back from the Council with the

Upper Flint Water Planning Council
Council Meeting 3
Meeting Date: November 20, 2009

B&V Project 164139
November 23, 2009

highlights. Kristin provided a sign-up sheet for the joint meetings and asked members to indicate which meeting they plan to attend.

At this time, Donald Chase had to leave the meeting, and Dick Morrow (Vice Chair) presided over the remainder of the meeting.

Public Involvement Plan

Kristin reviewed several edits to the Public Involvement Plan (PIP), which was presented at the last meeting. The revised PIP was included in the Council's pre-meeting packet. Kristin asked if there were any additional comments or concerns. Kristin noted this plan will be an appendix to the regional Water Development and Conservation Plan.

With no objections, the revised Public Involvement Plan was adopted by consensus.

Regional WDCP Outline

Kristin discussed the primary parts of the regional water development and conservation plan (WDCP) and reviewed important milestones, roles, and responsibilities for the Council in the planning process. First, she noted that the State Water Plan (Section 14(7)) lays out required principal elements of WDCPs:

- Describe the region's water resources, water users, local governments and education and implementation partners
- Forecast through 2050: population, domestic water use, commercial water use
- Compare forecasts with the water resource assessments
- Based on the comparison, recommended management practices for region
- Outline additional data and information needs
- Determine benchmarks for assessing plan effectiveness

Next, Kristin noted some things that Council Members need to consider for the WDCP:

- Plans will have a mix of EPD-provided information and Council-led products
- "Audiences" for plan
- Fulfillment of regional vision and goals
- Maps, figures, tables
- Council member expectations
- "Extra elements" beyond the minimum

She noted that a Table of Contents for the plan will be available at Council Meeting 5 (CM5). Kristin then reviewed Council roles and responsibilities, as shown below, noting which were already addressed or underway.

Upper Flint Water Planning Council
Council Meeting 3
Meeting Date: November 20, 2009

B&V Project 164139
November 23, 2009

Regional Water Planning Council Roles and Responsibilities

- 1: Attend and actively participate in regional water planning council meetings
- 2: Sign a MOA and follow operating procedures
- 3: Finalize and follow the Public Involvement Plan
- 4: Receive and incorporate input from local governments and the public
- 5: Draft regional vision and update throughout the planning process
- 6: Understand the water resource assessments
- 7: Understand forecasts of water and wastewater demands
- 8: Compare results of resource assessments with water and wastewater forecasts in order to identify any “gaps”
- 9: Select, refine, and finalize selection of management practices
- 10: Coordinate with neighboring regional water planning councils regarding the selected water management practices
- 11: Prepare a recommended regional water plan and submit to the Director of EPD for review and approval. Make revisions based on comments from EPD and the public.

Kristin said she wanted to define a couple of terms the council will be hearing quite a bit in the coming months:

- **Water Resource “Gap”:** For quantity, this is the difference between the available resource (i.e., supply) and the sum of needs/demands. For quality, this is the difference between the capacity of receiving waters to assimilate wastewater and the sum of needs/demands associated with the discharge of wastewater. A water quality gap also occurs where water quality standards are violated. A gap may be defined geographically or by water use type (surface water, groundwater).
- **Management Practice:** Any program or activity that helps meet the regional vision and goals or that can be employed to ensure that there is sufficient water (surface and groundwater quantity) and assimilative capacity (surface water quality) to sustainably meet future needs. Management practices can increase resource capacity and/or adjusts forecasted demands.

Kristin then reviewed the next steps for this process which included:

- Resource Assessment Models – *January 2010 (Joint Council Meetings)*
- Management Practices Survey – *Early 2010*

Upper Flint Water Planning Council
Council Meeting 3
Meeting Date: November 20, 2009

B&V Project 164139
November 23, 2009

- Initial discussion, selection, and refinement of Management Practices – *Council Meetings 5, 6, and 7*
- Finalize selection of Management Practices by *December 2010*

The council members had the following questions:

- Brant Keller asked if there were going to be any “dollar and cents” associated with these management practices. Kristin said that the Council can review costs associated with the management practices.
- Cliff Arnett was concerned that the Council not overlook ongoing water quality studies. A council member asked if we are going to get a better handle on the status quo of our water resources. Kristin said this will be part of the January joint meetings which will discuss both quantity and the quality of our water resources. Kristin noted Liz Booth with EPD will be discussing some of this later in the meeting.
- Brant Keller suggested a presentation for the Flint River Plan. Kristin said this was a great point. She noted that they had already done a similar presentation for the Lower-Flint Ochlockonee. This presentation was later incorporated into the meeting.
- Beth English asked if this management survey could also include suggestions for best management practices from outside the region to consider. Kristin said yes.

Agricultural Water Demand Forecasts

Kristin reminded the members about the review of the agricultural water demand forecasts at the last council meeting. She noted that in this region, dairy was brought up as an example of an agricultural sector for which there was a data gap. She said that input was still being sought to identify data gaps in forecasts and that the agriculture forecasts are available through council website. Next, she explained several things that had happened since the last council meeting to address “gaps” in the forecasts.

She noted that the Farm Bureau was working with several statewide agricultural organizations and state agencies to develop state level estimates for various agricultural sectors that were not included in the forecasts (non-irrigation agricultural water use and users below 100,000 gallons/day). Several water planning councils have formed subcommittees to investigate these types of agricultural water-use.

Through the Georgia Farm Bureau led effort, data are currently being compiled from the various sectors of concern, and it is expected that these data will be available to the subcommittees and councils in the next few weeks. These estimates will provide a

Upper Flint Water Planning Council
Council Meeting 3
Meeting Date: November 20, 2009

B&V Project 164139
November 23, 2009

“snap-shot” of current data in these agricultural water-use sectors, but will not include projections of future use. Upon receipt of these estimates, the councils and the subcommittees can decide on how to include this information in their own regional plans.

Council member Cliff Arnett expressed concern that the council is being asked to speed up, but that it seems like we are waiting on data. Kristin said that was a common concern that has been expressed by many of the councils.

Industrial Water Forecast

Robert Osborne explained that there were four major water use forecasting modules which included:

- **Agricultural** – Major forecasts complete; evaluating if/how to incorporate small/unpermitted uses
- **Energy** – Forecasts under development with assistance from power/energy companies
- **Municipal** – Includes residential, commercial, and light industrial water use
- **Industrial** – Major water using industries

Robert explained that he would mostly focus on the industrial forecasts at this meeting. These forecasts are based on the continuation of current trends and practices into the future. Robert emphasized that these forecasts form the basis for regional water planning, not for making individual permit decisions

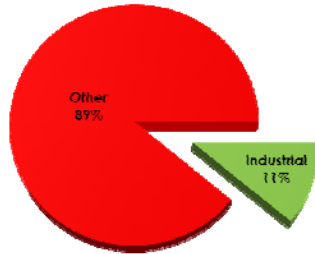
Robert then presented the following graphs which showed industrial water withdrawal as a percent of the total withdrawals in Georgia and the combined withdrawals of the 13 major industries as a percent of the total industrial withdrawal in Georgia. Industrial water use is only 11% of the total withdrawals in Georgia, and 90% of the industrial water use is utilized by 13 major industrial use categories. These are the focus of the forecasting effort.

Upper Flint Water Planning Council
 Council Meeting 3
 Meeting Date: November 20, 2009

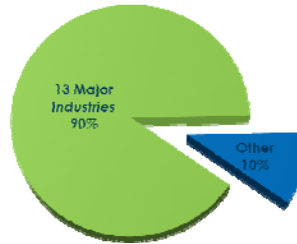
B&V Project 164139
 November 23, 2009

Industrial Water Withdrawal Percentages

**Industrial Water Withdrawals
 as a Percent of Total
 Withdrawals in Georgia**



**Combined Withdrawals of 13
 Major Industries as a Percent
 of Total Industrial Withdrawal
 in Georgia**



Robert said that water use by NAICS category increases at the same rate as NAICS employment (growth estimates competed by CVIOG). However, if NAICS employment decreases, then NAICS water use remains the same. Robert presented the results. Differences between the forecasts will be discussed with industry representatives. Robert said current forecasts are being shared with the industry ad hoc group and the public (via website).

Council members had the following questions and comments:

- Cliff Arnett was concerned about validity of the methodology and the margin of error. Brant Keller noted he was concerned that industrial water use numbers based on employment are not as scientific as he would like to see. He said that it would be possible for a plant to have layoffs, but it could still use the same amount of water.
- Dick Morrow and Robert Osborne discussed industrial per capita vs. overall municipal per capita and how the large industrial has been removed from the municipal per capita estimates. Dick Morrow asked about small industries that get water from a municipal system. Those water use numbers would be part of the municipal numbers. Liz Booth (EPD) mentioned that the water supplied to industry must still be accounted for by the municipal numbers, and vice versa. Robert Osborne clarified that industry water use was being moved from the municipal water forecasts to be accounted for in the industrial water forecasts.

Upper Flint Water Planning Council
Council Meeting 3
Meeting Date: November 20, 2009

B&V Project 164139
November 23, 2009

- Brant Keller said that commercial water use skews the residential water use numbers. He provided an example of a small industry that had closed and caused a drop of 10% of his system's water demand. There must be more discussion on how these data will be used.
- Cliff Arnett wanted to know when we would get the ad hoc data. Robert said he could share the data in December with the council or subcommittee.
- Brant Keller noted he would like to see the background data. Brant said for his system, water use data are broken down into commercial, residential, industrial, and whole-sale. Robert said that this will be distributed so that the committee members can assist in filling in the data gaps.
- Brant Keller asked whether the municipal and industrial forecasts considered the Water Conservation Implementation Plan (WCIP). He said that the DNR Board would soon be promulgating rules related to the WCIP. Tim Cash said that this DNR Board action would probably not be until next year.

Dick Morrow asked who was on the municipal subcommittee. The following members are on this subcommittee: Cliff Arnett, Bill Sawyer, Dick Morrow, Beth English, Hays Arnold, and Michael Beres. Dick invited non-council members to attend the subcommittee meetings. He directed them to contact Kristin if they would like any information on the subcommittee.

Energy Water Use

Robert explained that the future energy forecasts will focus on thermoelectric power production and the associated water needs. Basic steps will involve the following:

- Conducting an inventory of current power generating facilities
- Verifying facility location, fuel type (e.g. coal, natural gas, nuclear), cooling system characteristics, operating capacity, total water intake and water consumption
- Analysis of national and regional trends
- Developing a method to quantify growth rate for future forecasting

Robert noted that there are several influencing factors associated with the energy forecasts including:

- Amount of power needed (function of rate of growth in population and economy)
- Future mix of fuel types (e.g., coal, natural gas, nuclear, biomass, wind, sun)
- Geographic distribution of thermoelectric power water demand
- Primary generation method (e.g., steam turbine, gas turbine, combined cycle)

Upper Flint Water Planning Council
Council Meeting 3
Meeting Date: November 20, 2009

B&V Project 164139
November 23, 2009

- Cooling system (e.g., once-through cooling versus closed-loop cooling)
- Determination of geographic placement of fuel types within Georgia

These forecasts are expected to be available at CM5.

Water Quality Assessment

Dr. Liz Booth with Georgia Environmental Protection Division (EPD) explained that the surface water quality assessment involves determining the streams' assimilative capacities. The assimilative capacity is the amount of contaminant load that can be discharged to a specific water body without exceeding water quality standards or criteria. The assimilative capacity is the ability of a water body to naturally absorb and use a discharged substance without water quality becoming impaired or aquatic life being harmed.

She noted a stream that is impaired is one that is not meeting the water quality standard for a given parameter. This means that the ability of the stream to assimilate that parameter has been exceeded. Impaired streams are listed on the 305(b)/303(d) lists. Listings are for violations of standards for organics, pH, toxicity, dissolved oxygen, and fecal coliform. Additionally, listings are made based on fish consumption advisories and biota levels. Dr. Booth showed slides with listed streams in the region and the state marked. For the region, approximately half of all impaired listings are listed for fecal coliform.

As part of EPD's assessment of assimilative capacity state-wide, EPD will determine the available assimilative capacity for the state rivers, streams, lakes and estuaries by developing water quality models for these water bodies using available data and conservative assumptions. The models will be calibrated to existing field data and discharge data from the same time period. The current wasteload allocations will be evaluated by inputting the permitted and newly proposed dischargers into the model at their permit limits. The results of the model will show areas with available assimilative capacity and areas that are already over-allocated or where there are other challenges.

The EPD is using several types of computer models to evaluate assimilative capacity: Steady State River and Stream Models; Steady State Estuary Models; Hydrodynamic River Models; Watershed models; and Lake and Estuary Models. Some of the models include: GA DOSAG (steady state), GA ESTUARY (steady state), GA RIV-1 (hydrodynamic), LSPC (watershed model), EFDC and WASP (lake and estuary models). Dr. Booth said that the DOSAG model is a workhorse tool that the agency uses to determine waste load allocations for NPDES discharge permits. For the assessment, EPD is developing steady state GA DOSAG models for the whole state and GA ESTUARY models for those estuaries that have discharges in them. EPD will also be developing watershed models for those areas noted in a map included in the presentation. She noted

Upper Flint Water Planning Council
Council Meeting 3
Meeting Date: November 20, 2009

B&V Project 164139
November 23, 2009

river and lake models will be developed for the Chattahoochee River Basin downstream for Buford Dam and the entire Flint River Basin.

The watershed models LSPC will be developed and linked to three dimensional hydrodynamic lake and estuary models EFDC or WASP. The watershed models will predict the flow and storm water quality based on landcover, impervious surface, surface slope, soil, and meteorological data. The milestones for completion include:

- DOSAG Models (Cal/Val) – December 2009
- Current Assimilative Capacity Runs – January 2010
- Watershed Model (Cal/Val) – June 2010
- River Model (Cal/Val) – September 2010
- Lake Blackshear Model (Cal/Val) – September 2010
- Current Assimilative Capacity Runs (Watershed, River and Lake) – November 2010

The future assimilative capacity assessment will be performed using the calibrated models to evaluate the water quality impact of forecasted flows, proposed discharge locations, and future landuse patterns. Based on the model results, a range of discharge allocation options will be proposed. Using an iterative approach, the councils can evaluate various options for management. Best management practices will be used to bridge gaps. Management practices might include tighter permit limits, moving the location of a discharge to a stream that has more assimilative capacity, or developing green infrastructure for stormwater management.

Dr. Booth said that modeling related to nutrients would not be done until late in 2010, but that nutrients would likely be of greater importance in the ACF Basin in the coming year. In early 2010, Florida is establishing nutrient standards, and these standards will affect the whole ACF Basin.

Council members had the following questions and comments:

- Cliff Arnett asked about nonpoint source pollution in DOSAG. Dr. Booth advised that nonpoint sources are not included in the low flow critical conditions modeled.
- Cliff Arnett asked whether the Upper Flint was modeled. Dr. Booth replied that the DOSAG model should be done in January 2010, and the watershed model for the Flint above Lake Blackshear by fall 2010.
- Dick Morrow said that EPD had formerly stated a preference for wastewater treatment by land application, but that preference had seemed to change in favor of discharges. He asked what the current thinking was on this. Dr. Booth replied that it depends on the assimilative capacity of a system.
- Joel Wood asked if there would be nutrient load limits for Lake Blackshear. Dr. Booth said that these would be developed eventually.

Upper Flint Water Planning Council
Council Meeting 3
Meeting Date: November 20, 2009

B&V Project 164139
November 23, 2009

Dr. Booth said the baseline resource assessments should be completed by the end of the year. Then, EPD will be able to model future scenarios with future withdrawals and returns provided by the councils.

EPD Director

Tim Cash discussed the fact that EPD has a new Director, Allen Barnes. He reported that Director Barnes had a full day meeting on the state water plan to be briefed and brought up to speed, and that he had expressed a high level of interest in meeting with the Chairs/Vice Chairs in December. An announcement of the new director was in the meeting packet.

Flint Plan Update

Earlier in the meeting, Council members had requested an overview of the existing Flint Plan. Because the meeting was ahead of schedule, Mark Masters with the Georgia Water Planning and Policy Center (GWPPC) presented an overview of the Flint Plan. The Flint Plan involved scientific assessment of water resources and led to adoption of new water resource management practices. Mark reviewed the assessment process and the new management practices that came from the Flint Plan. Mark's slides are available through the Council web portal.

During the development of the Flint Plan, there was a moratorium on new agricultural groundwater withdrawal permits from the Floridan aquifer. The technical studies for the Flint Plan demonstrated that groundwater withdrawals do affect streamflow in the basin. One outcome of the technical work was a map now used in permitting withdrawals, including varying restrictions for capacity use, restricted use, and conservation use areas, based on the impact on flows. With the adoption of the Flint Plan and the adoption of new management practices for agricultural withdrawals, the moratorium was lifted in March 2006.

Council members had the following questions:

- Cliff Arnett asked how the development of the plan was funded. Mark said it was through EPD.
- Joel Wood asked whether an agricultural withdrawal permit transfers with land in a land sale. Mark answered yes. Mr. Wood asked how they could be sure that maintenance plans would be followed by the new owner. Mark responded that new owners would be expected to fulfill the permit requirements, including maintenance requirements.

Upper Flint Water Planning Council
Council Meeting 3
Meeting Date: November 20, 2009

B&V Project 164139
November 23, 2009

- Some members asked about the requirement for agricultural water meters. Mark said that meters were required for new permits, and under the state metering program, older withdrawal (pre-2003) had meters provided to them by the state.
- A council member asked when was the plan adopted. Mark said the final plan was adopted in March 2006. The DNR Board adopted related rules in February 2006.
- Cliff Arnett asked whether the Flint Plan would be reviewed, as specified, after 3 years. Tim Cash said that the plan would be reviewed as a part of this planning process. He also noted that the Flint Plan does not directly affect this region.

Lunch

Don Smith, assistant to the president of South Georgia Technical College, gave the council an overview of the college during lunch.

Groundwater Resource Assessment

Dr. Jim Kennedy, State Geologist, spoke about the groundwater assessments. He said a comprehensive accounting of the sustainable yields of all aquifers in Georgia would be extraordinarily expensive and time consuming. Therefore, assessments of sustainable yield for aquifers had been prioritized. The bases for aquifer prioritization include the following:

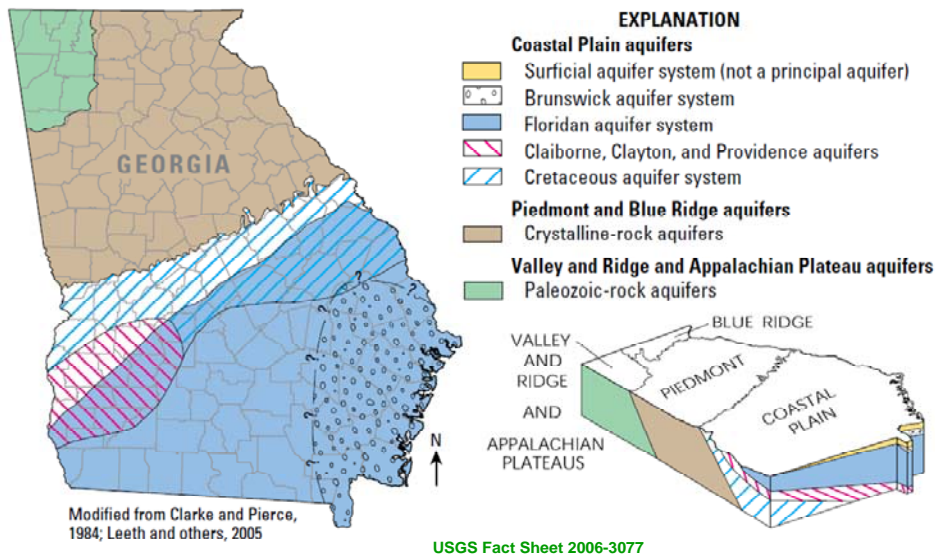
- Functional characteristics of the aquifer (extent and thickness, recharge to the aquifer, well yield)
- Existing evidence of adverse effects due to withdrawals
- Forecasts suggesting significant increases in demands
- Aquifers where it will not be possible to determine sustainable yield within a reasonable time period.

Dr. Kennedy explained the different aquifers in Georgia as shown in his slide below.

Upper Flint Water Planning Council
 Council Meeting 3
 Meeting Date: November 20, 2009

B&V Project 164139
 November 23, 2009

Georgia's Aquifers



2

Dr. Kennedy explained that numerical (MODFLOW) computer models of Coastal Plain aquifers where most groundwater is withdrawn, where groundwater withdrawals have caused some unacceptable impacts, and where forecasts suggest increases in future withdrawals are being completed. Unacceptable impacts include saltwater intrusion, sinkholes, affects on surface water flows, and high groundwater level drawdowns.

After reviewing a series of groundwater maps, Dr. Kennedy explained the sustainable use benchmarks which were used for the assessment, including the following:

- Drawdowns of groundwater levels between pumping wells in the pumped aquifer do not exceed 30 feet so as not to affect nearby wells
- Do not decrease stream flow below 60 percent of the mean annual discharge during April to September and 40 percent during October to March (Tennant method “outstanding” flow to maintain a health aquatic ecosystem)
- Over time the reduction in aquifer storage becomes asymptotic to a new base level
- Do not lower groundwater levels below the top of a confined aquifer (thereby making the aquifer unconfined)
- Do not exceed the ability of the aquifer to recover to baseline groundwater levels between periods or higher pumping during droughts

Dr. Kennedy said preliminary results show sustainable yield, both above and below the fall line, is generally higher than current withdrawals. Dr. Kennedy said he does not

Upper Flint Water Planning Council
Council Meeting 3
Meeting Date: November 20, 2009

B&V Project 164139
November 23, 2009

know how much the yield exceeds withdrawals, but that he will have the results ready to present in January.

Questions and comments from the Council members included the following:

- Lynmore James asked if Georgia has considered pumping water into the aquifer. Dr. Kennedy responded that this practice, known as Aquifer Storage and Recovery (ASR) is done in many places, such as Florida and South Carolina. The water is treated prior to injection into the aquifer. Dr. Kennedy said that current regulations prohibit ASR in Georgia in the Floridan aquifer. This prohibition sunsets in June 2014. He said that ASR is being evaluated in North Georgia at this time.
- Cliff Arnett was curious about fractured rock north of the Fall Line and whether there are techniques available to reliably assess the availability and sustainability of groundwater within those fractures. Dr. Kennedy said yes, and he identified Nils Thompson of LBG as an experienced modeler, especially in using MODFLOW, in all of the physiographic provinces of Georgia.
- Terrell Hudson asked whether septic and land application systems are 100% consumptive. Dr. Kennedy explained that most of this water comes back to the system, but it takes time, possibly more than 20 years.
- Frank Keller asked how confident we could be in the computer projections. Dr. Kennedy replied that he had confidence in the projections. He explained that professional judgment was also important (as well as computer models).
- Cliff Arnett asked about the importance of recharge areas to availability of water. Dr. Kennedy said this is an important question for the coastal plain. He said that many recharge areas are just below the fall line (within about 40 miles) and that we need to be careful about use in these areas.

Local Elected Officials and Public Comments

Next, the Council provided time for local elected officials and the general public to address the council. Representative Lynmore James said that he was learning a lot in this process. There were no members of the general public who spoke.

Wrap-Up and What to Expect Next Meeting

The Council selected March 19, 2010, for its next meeting. It was suggested that the meeting be in Cordele or at Lake Blackshear. Kristin will check on availability of the Lake Blackshear facility.

Upper Flint Water Planning Council
Council Meeting 3
Meeting Date: November 20, 2009

B&V Project 164139
November 23, 2009

Council Meeting 4 Evaluation

At the conclusion of the council meeting, the members completed an evaluation form on the meeting, and the meeting was adjourned.

Upper Flint Water Planning Council
Council Meeting 3
Meeting Date: November 20, 2009

B&V Project 164139
November 23, 2009

Attachment 1:

**Upper Flint Water Planning Council
Council Meeting Attendance – November 20, 2009**

Council Members

Clifford Arnett

Hays Arnold

Mike Beres

Michael Bowens

Gene Brunson

Donald Chase

William Culpepper

Beth English

Harold Fallin

Eddie Freeman

George Hooks

Terrell Hudson

Lynmore James

D. Raines Jordan

Frank Keller

Brant Keller

Buddy Leger

Dick Morrow

Gary Powell

Jim Reid

Bill Sawyer

Joel Wood

Council Members Not In Attendance

Greg Barineau

Tommy Burnsed

Mike Donnelly

Jack Holbrook

Lamar Perlis

Kip Purvis

Charles Rucks

Randall Starling

Planning Consultants

Robert Osborne, B&V

Steve Simpson, B&V

Mark Masters, GWPPC

Kristin Rowles, GWPPC

Nils Thompson, LGB

Other Agencies

Jimmy Evans, GA DNR

Steve McWilliams, GA Forestry
Association

Georgia EPD

Tim Cash, Assistant Branch Chief

Bill Morris

Georgia Soil and Water Conservation

Commission

Ben Mosely

Georgia Department of Community

Affairs

Corinne Thornton