Technical Memorandum

From: Surface Water Availability Resource Assessment Team – Jeffrey Regan and Jennifer Miller
To: Regional Planning Councils, EPD Planning Team, Planning Contractors, File
Date: September 13, 2010

Subject: Summary Future (2030) Resource Assessment in Oconee, Ocmulgee, Altamaha River Basin

Introduction

The purpose of this memorandum is to summarize the results of future Resource Assessment (RA) in the Oconee, Ocmulgee, Altamaha (OOA) River Basin with projected 2030 water use conditions. The projected water use conditions (including municipal, industrial, thermal energy, and agricultural) were provided by EPD Planning Team in September 2010.

We used the River Basin Planning Tool (RBPT) in both the Current RA and 2030 Future RA. The objective of the 2030 Future RA is to provide Regional Planning Councils and their Planning Contractors a starting point in assessing whether the available resource can meet both the off-stream and instream needs into the forecast future. If the available resource cannot satisfy the needs, then Best Management Practices (BMP's) will be considered to satisfy the needs.

Model Settings and Key Assumptions

The OOA Basin model contains 6 Planning Nodes and corresponding sub-basins (or 11 Basic Nodes and corresponding Local Drainage Areas) (See Figure 1).

The hydrological conditions incorporated in the model include unimpaired incremental flow on daily basis for the period between 1939 and 2007. The flow data have been incorporated at all 11 Basic Nodes.

Forecast annual average withdrawal and discharge of each sub-basin have been temporally distributed to monthly values according to intra-annual patterns of current conditions. The sub-basins are the finest spatial resolution in the planning models. The water use data are aggregated at the planning nodes and do not reflect any single individual facilities, existing or planned.

There are not additional Management Practices (MP's) beyond those that have been reflected by Current RAs or by forecast 2030 demands. The amount of storage for each sub-basin remains the same as in Current RA. Like the water use data, the reservoir storage volumes have been aggregated at the sub-basin level or the planning nodes. Therefore, the storage information incorporated in the model does not reflect the site or size of any single reservoir.

In the unregulated portion of the basin, flow regime is defined by the State's Interim Instream Flow Protection Policy, which calls for the protection of monthly 7Q10 or natural inflow, whichever is lower. In the OOA Basin, this applies only to the Penfield node.

In the regulated portions of the basin, flow regime is limited to locations where an explicit flow requirement is specified by the Federal Energy Regulatory Commission (FERC). In the OOA Basin, this applies to the Milledgeville and Jackson nodes.

Summary of Results

Penfield Planning Node:

With projected 2030 water use and no additional MP's, there is not a gap between the available resource and the combined off-stream and instream needs.

There is no shortage in meeting water demand in this sub-basin. The sub-basin's current and future consumptive demand and lack of shortage in meeting withdrawal demand are shown in figures "TS-Consumptive" and "Gap-Dem" in the attached file (titled 20100913-SWP-2030-NMP-OOA-Penfield.xls) and Table 1. There is no at-site flow requirement shortage as shown by Figures "Fut-TS" and "Gap-FR" in the attached file (titled 20100913-SWP-2030-NMP-OOA-Penfield.xls) and Table 1.

Table 1. Summary of Penfield Node.

Scenario	Length of Shortfall (% of time)	Average Shortfall (cfs)	Long-term Average Flow (cfs)	Maximum Shortfall (cfs)	Corresponding Flow Regime (cfs)
Current Consumptive Demand	0%	0 (0 MGD)	1199 (775 MGD)	0 (0 MGD)	N/A
2030 Forecasted Consumptive Demand	0%	0 (0 MGD)	1182 (764 MGD)	0 (0 MGD	N/A

The modeled flow under forecast demand is generally lower than modeled under current demand conditions, because of increased consumptive demands in the Penfield sub-basin. This is shown in Figures "POR (nat)" and "Cur,Fut TS".

Milledgeville Planning Node:

With projected 2030 water use and no additional MP's, our model was able to meet all water supply needs. However, this is not to assume that increased water use from the large storage projects are authorized by owners and operators of the projects. If any planning activity is based on this assumption, then the planners need to confirm the assumption with the project owners. For this reason, any additional water supply needs directly from the storage projects are considered potential gaps, unless and until appropriately authorized.

The sub-basin's current and future consumptive demand and lack of shortage in meeting withdrawal demand are shown in figures "TS-Consumptive" and "Gap-Dem" in the attached file (titled 20100913-SWP-2030-NMP-OOA-Milledge.xls) and Table 2. There is no shortage in meeting the at-site flow requirement, as shown by Figures "Fut-TS" and "Gap-FR" in the attached file (titled 20100913-SWP-2030-NMP-OOA-Milledge.xls) and Table 2.

Table 2. Summary of Milledgeville Node

Scenario	Demand Shortfall (cfs)	Upstream Reservoir Flow Requirement Shortage (cfs)	Minimum Conservation Storage Remaining (ac-ft)	Column 4/Total Conservation Storage (%)	Basin-wide Flow Requirement Shortage (cfs)
Current Consumptive Demand	0	0	92,140 at Milledgeville	61% at Milledgeville	N/A
2030 Forecasted Consumptive Demand	0	0	86,375 at Milledgeville	58% at Milledgeville	N/A

The 2030 modeled reservoir storage is generally lower than the storage modeled under current demand conditions because of increased withdrawals in the Milledgeville and Penfield sub-basins.

The modeled flow under forecast demand is generally lower than modeled under current demand conditions, because of increased withdrawals in the Milledgeville and Penfield sub-basins. The main reason for of the increase in withdrawals is because of forecast municipal activity. This is shown in Figures "POR (nat)" and "Cur,Fut TS".

Mount Vernon Node:

With projected 2030 water use and no additional MP's, there is not a gap between the available resource and the combined off-stream and instream needs.

There is no shortage in meeting water demand in this sub-basin. The sub-basin's current and future consumptive demand and lack of shortage in meeting withdrawal demand are shown in figures "TS-Consumptive" and "Gap-Dem" in the attached file (titled 20100913-SWP-2030-NMP-OOA-Vernon.xls) and Table 3. There is no at-site flow requirement as shown by Figures "Fut-TS" and "Gap-FR" in the attached file (titled 20100913-SWP-2030-NMP-OOA-Vernon.xls) and Table 3.

Table 3. Summary of Mount Vernon Node

Scenario	Demand Shortfall (cfs)	Upstream Reservoir Flow Requirement Shortage (cfs)	Minimum Conservation Storage Remaining (ac-ft)	Column 4/Cons Storage (%)	Basin-wide Flow Requirement Shortage (cfs)
Current Consumptive Demand	0	0	92,140 at Milledgeville	61% at Milledgeville	N/A
2030 Forecasted Consumptive Demand	0	0	86,375 at Milledgeville	58% at Milledgeville	N/A

Overall, the modeled flow under forecast demand is slightly lower than the flow modeled under current demand conditions because increased withdrawal demands are forecasted in the Oconee Basin. This is shown in Figures "POR (nat)" and "Cur,Fut TS".

Jackson Planning Node:

With projected 2030 water use and no additional MP's, our model was able to meet all water supply needs. However, this is not to assume that increased water use from the large storage projects are authorized by owners and operators of the projects. If any planning activity is based on this assumption, then the planners need to confirm the assumption with the project owners. For this reason, any additional water supply needs directly from the storage projects are considered potential gaps, unless and until appropriately authorized.

The sub-basin's current and future consumptive demand and lack of shortage in meeting withdrawal demand are shown in figures "TS-Consumptive" and "Gap-Dem" in the attached file (titled 20100913-SWP-2030-NMP-OOA-Jackson.xls) and Table 4. There is no shortage in meeting at-site flow requirement, as shown by Figures "Fut-TS" and "Gap-FR" in the attached file (titled 20100913-SWP-2030-NMP-OOA-Jackson.xls) and Table 4.

Table 4. Summary of Jackson Node

Scenario	Demand Shortfall (cfs)	Upstream Reservoir Flow Requirement Shortage (cfs)	Minimum Conservation Storage Remaining (ac-ft)	Column 4/Total Conservation Storage (%)	Basin-wide Flow Requirement Shortage (cfs)
Current Consumptive Demand	0	0	61,945 at Lake Jackson	83% at Lake Jackson	N/A
2030 Forecasted Consumptive Demand	0	0	57,947 at Lake Jackson	78% at Lake Jackson	N/A

The 2030 modeled reservoir storage is generally lower than the storage modeled under current demand conditions, because of increased withdrawals in the Jackson sub-basin.

The modeled flow under forecast demand is almost equivalent to flow modeled under current demand conditions because increased demands are forecasted along with equivalent increased returns in the Jackson sub-basin. This is shown in Figures "POR (nat)" and "Cur,Fut TS".

Lumber City Node:

With projected 2030 water use and no additional MP's, there is not a gap between available resource and the combined off-stream and instream needs.

There is no shortage in meeting water demand in this sub-basin. The sub-basin's current and future consumptive demand and lack of shortage in meeting withdrawal demand are shown in figures "TS-Consumptive" and "Gap-Dem" in the attached file (titled 20100913-SWP-2030-NMP-OOA-Lumber.xls) and Table 5. There is no at-site flow requirement as shown by Figures "Fut-TS" and "Gap-FR" in the attached file (titled 20100913-SWP-2030-NMP-OOA-Lumber.xls) and Table 5.

Table 5. Summary of Lumber City Node

Scenario	Demand Shortfall (cfs)	Upstream Reservoir Flow Requirement Shortage (cfs)	Minimum Conservation Storage Remaining (ac-ft)	Column 4/Total Conservation Storage (%)	Basin-wide Flow Requirement Shortage (cfs)

Current Consumptive Demand	0	0	61,945 at Lake Jackson	83% at Lake Jackson	N/A
2030 Forecasted Consumptive Demand	0	0	57,947 at Lake Jackson	78% at Lake Jackson	N/A

The modeled flow under forecast demand is generally higher than modeled under current demand conditions because of increased returns in the Jackson and Lumber City sub-basins. This is shown in Figures "POR (nat)" and "Cur,Fut TS". The main reason for this amount of return is because of forecast municipal returns in the Jackson sub-basin and forecast industrial returns in the Lumber City sub-basin.

Doctortown Node:

With projected 2030 water use and no additional MP's, there is not a gap between the available resource and the combined off-stream and instream needs.

There is no shortage in meeting water demand in this sub-basin. The sub-basin's current and future consumptive demand and lack of shortage in meeting withdrawal demand are shown in figures "TS-Consumptive" and "Gap-Dem" in the attached file (titled 20100913-SWP-2030-NMP-OOA-Doctown.xls) and Table 6. There is no at-site flow requirement as shown by Figures "Fut-TS" and "Gap-FR" in the attached file (titled 20100913-SWP-2030-NMP-OOA-Doctown.xls) and Table 6.

Table 6. Summary of Doctortown Node

Scenario	Demand Shortfall (cfs)	Upstream Reservoir Flow Requirement Shortage (cfs)	Minimum Conservation Storage Remaining (ac-ft)	Column 4/Total Conservation Storage (%)	Basin-wide Flow Requirement Shortage (cfs)
Current Consumptive Demand	0	0	61945 At Lake Jackson and 92,140 at Milledgeville	83% At Lake Jackson and 61% at Milledgeville	N/A
2030 Forecasted Consumptive Demand	0	0	57,947 at Lake Jackson and 86,375 at Milledgeville	78% at Lake Jackson and 58% at Milledgeville	N/A

In general, the modeled flow under forecast demand is almost equivalent to flow modeled under current demand conditions because increased demands are forecasted along with increased returns in the OOA basin. This is shown in Figures "POR (nat)" and "Cur,Fut TS".

Detailed Results

We provide detailed modeling results of each planning node in a summary MS Excel file. There are multiple figures in each file. The purposes of these figures are listed in Table 7 below:

Table 7. Metrics in Detailed Evaluation of Modeling Results

Variable Evaluated	Figure Tabs	Purpose of figures
Demand	TS-Consumptive	Monthly demand minus returns for a particular sub-basin equaling the net use.
	Gap-Dem	Time series of demand shortages or the "Onion" for current and future demands
Storage	TS-Stor	Time series of storage remaining with bottom of pool
	POR (stor)	Exceedance of POR storage remaining with bottom of pool
Stream Flow Time Series	Nat-TS	Unimpaired natural flow time series
	Nat,FR-TS	Unimpaired plus adjusted flow regime
	FR-TS	(adjusted flow regime)
	Cur-TS	(adjusted flow regime and current assessment flow)
	Fut-TS	(adjusted flow regime and forecasted assessment flow)
	Cur,Fut TS	(comparison of current and future flows)
	Fut,Nat TS	(comparison of unimpaired natural and future flows)
Flow Regime Shortage	Gap-FR	(Flow regime shortage or "Onion" for current and future demands)
Stream Flow Exceedance	POR-(Nat)	(exceedance of natural, current and future flows)
	Jan (cur)	January Monthly Exceedance of natural, current, future flows and Adjusted Flow regimes
	Feb (cur) through Dec (cur)	February through December Monthly Exceedance of natural, current, future flows and Adjusted Flow regimes

Table 8. Planning node and corresponding summary MS Excel file List.

Planning Node	Summary MS Excel File
Penfield	20100913-SWP-2030-NMP-OOA-Penfield.xls
Milledgeville	20100913-SWP-2030-NMP-OOA-Milledge.xls
Mount Vernon	20100913-SWP-2030-NMP-OOA-Vernon.xls
Jackson	20100913-SWP-2030-NMP-OOA-Jackson.xls
Lumber City	20100913-SWP-2030-NMP-OOA-Lumber.xls
Doctortown	20100913-SWP-2030-NMP-OOA-Doctown.xls

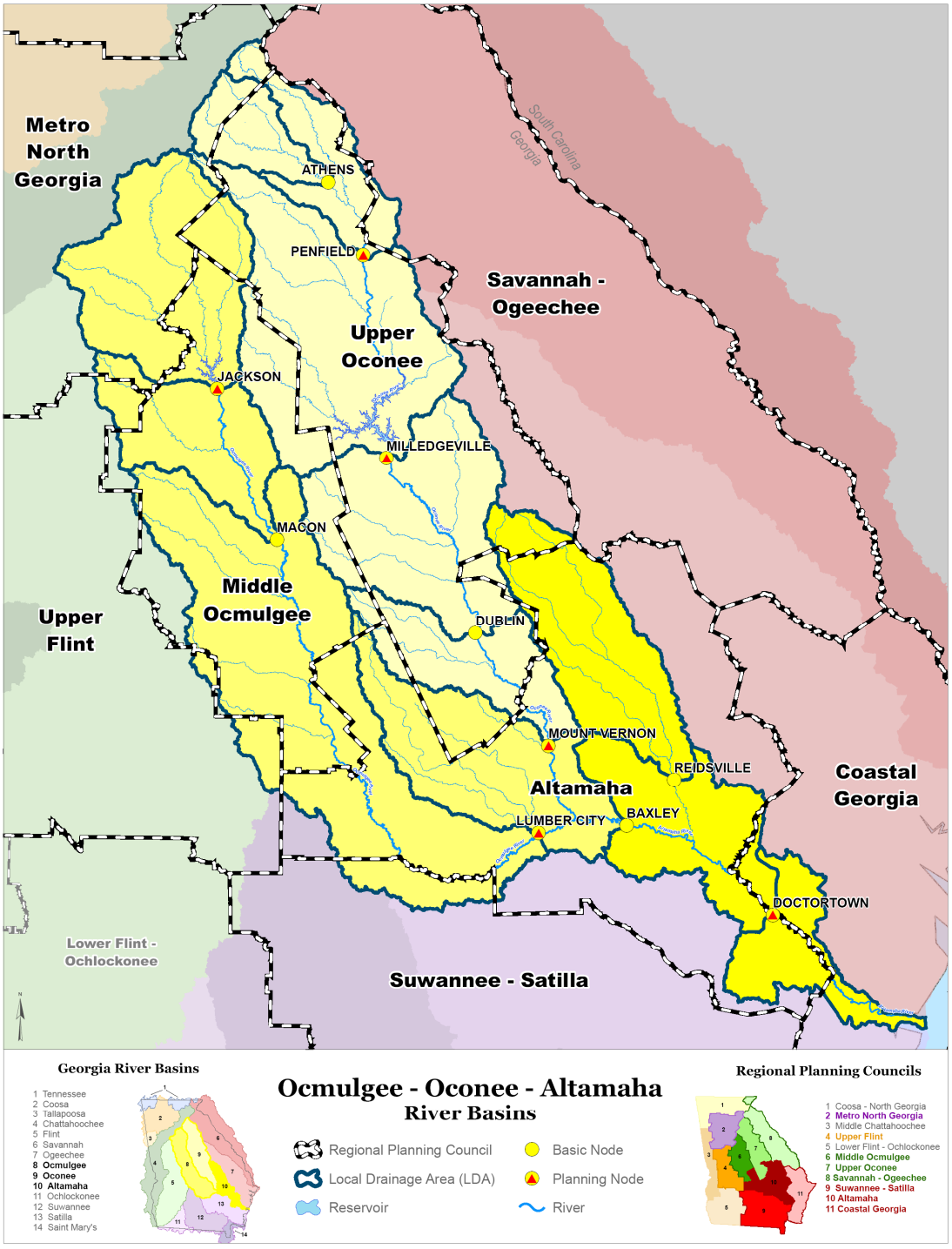

Figure 1. The Ocmulgee, Oconee, Altamaha River Basin