CCWA Board Work Session

Summary of Water Supply Needs Analysis

Carroll County Water Authority

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Needs Assessment Steps

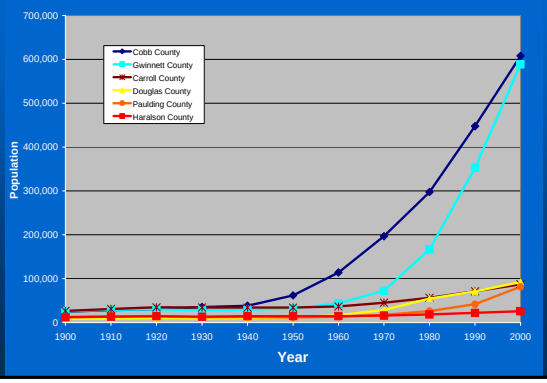
1. **Project Future Population**
2. **Project Future Water Demand**
3. **Identify Existing and Planned Water Supplies**
4. **Calculate Unmet Water Supply Need**

Population Projection

Consider:

- **Typical Population Growth Patterns**
- **Historical Growth Patterns in Surrounding Counties**
- **Recent Population Growth In & Around Carroll County**
- **Anticipated Growth and Existing Population Projections**
- **Significant Population Increase from Single Incoming Industry- not assumed**

Historic Population Growth in North Georgia



1. Future Population Projections

Population Projections for 2060:

Chattahoochee Basin:	**156,900**
Tallapoosa Basin:	**259,600**
Carroll County Total:	**416,500**

2. Project Water Demand in Carroll County

Population

x Per Capita Water Use

= Water Demand

Per Capita Water Demand

- Current (gcd): CCWA 75 (retail customers only)
  - Carrollton: 222 gcd Villa Rica: 140
  - Douglas: 118 gcd Clayton: 133 Fulton: 215
  - AWWARF study of 14 cities: 170 gcd average
- Future:
  - Increase with Shift from Residential to Mixed use and Increased Landscape Watering
  - Decrease with Water Conservation through Public Awareness, Low Flow Fixtures, Conservation Rate Structures, Water-Efficient Landscaping
  - For this Study: Assumed 135 gcd

Water Demand in 2060

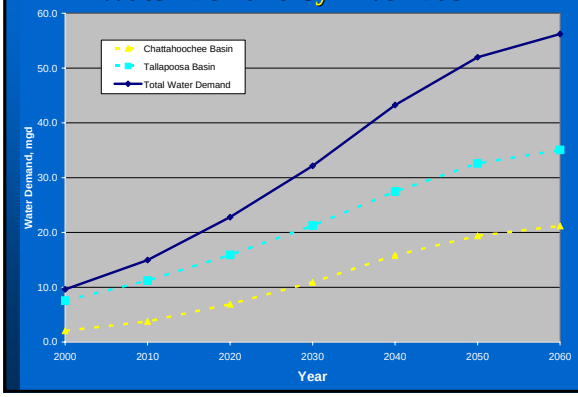
Population x Per Capita Dmd = Total Demand

416,500 people x 135 gcd = 56 mgd

By Basin:

Chattahoochee Basin	21 mgd
Tallapoosa Basin	35 mgd
Carroll County Total	56 mgd

Water Demand by River Basin



3. Existing Water Supply through 2060

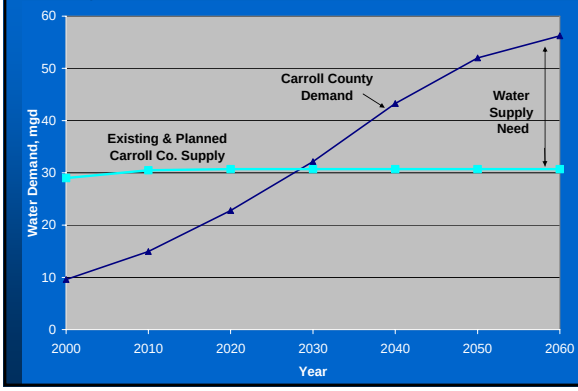
Chattahoochee Basin: 13.6 mgd

Tallapoosa Basin: 17.1 mgd

Carroll Co. Total: 30.7 mgd

Snake Creek Reservoir
660 acres
13.5 mgd permitted supply

Projected Future Water Demand and Need



4. Unmet Water Need for 2060:

Water Demand – Water Supply = Water Need

Chattahoochee Basin:	7.6 mgd
Tallapoosa Basin:	17.9 mgd
Carroll County Total:	25.5 mgd

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Water Supply Development

Water Supply Development Process

1. Determine Water Supply Need
2. Identify Water Supply Alternatives
3. Evaluate Water Supply Alternatives relative to impacts to wetlands, streams, protected species, cultural resources, infrastructure, technical feasibility and costs
4. Obtain Corps of Engineers' Section 404 Permit
5. Obtain EPD 401, Water Withdrawal Permits

Immediate Needs

- Our study focuses on the Little Tallapoosa Basin
  - greatest short term need
- Preliminary study of the Chattahoochee Basin indicates potential to expand the yield of Snake Creek Reservoir

Reservoir Alternatives: Little Tallapoosa River Basin

- **Initially identified 8 reservoir sites:**
  - Indian Branch
  - Turkey Creek Tributary
  - Garrett Creek Tributary
  - Indian Creek
  - Turkey Creek/Jumpin In Creek
  - Buck Creek Upper
  - Buck Creek Lower
  - Mountain Creek

Selection of Preferred Alternative

- **The "preferred alternative"**
  - **Least environmentally damaging practicable alternative capable of achieving the "Project Purpose"**
- "Practicable"
  - Cost
  - Logistics
  - Technology

Evaluation Criteria

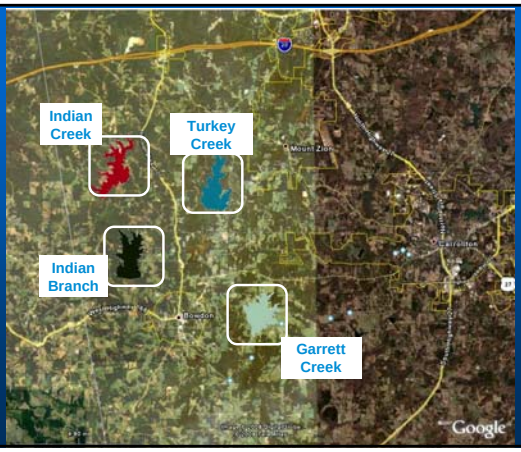
1. Project Yield
2. Stream Flow Impacts
3. Jurisdictional Waters Impacts
4. Threatened and Endangered Species Impacts
5. Cultural Resources Impacts
6. Human Environment Impacts
7. Capital and O&M Costs

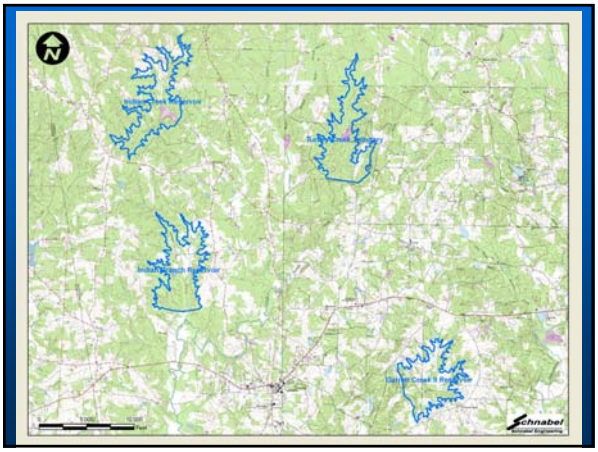
Short List of Sites

- **4 of the 8 sites were eliminated from further study based on:**
  - **Severe environmental impacts**
  - **Significant infrastructure impacts**
  - **Insufficient yield**
  - **Too expensive**

Short-Listed Sites:

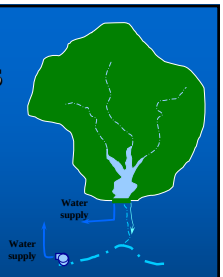
- **Garrett Creek Tributary**
- **Indian Branch**
- **Indian Creek**
- **Turkey Creek Tributary**





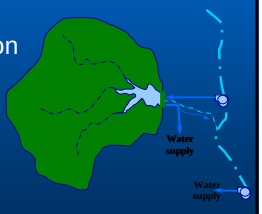
On-Stream Reservoirs

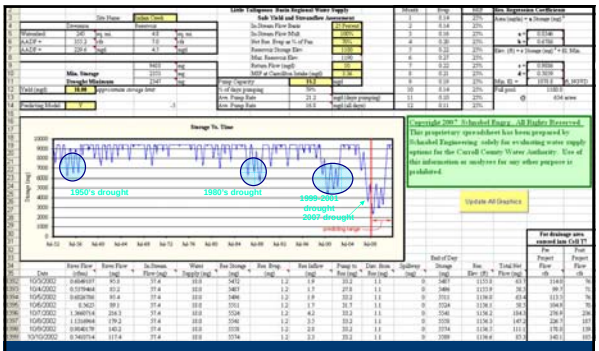
- Reservoir storage supplements water supply during low flows
- Reservoir is refilled by flows from within the watershed



Pumped-Diversion Reservoirs

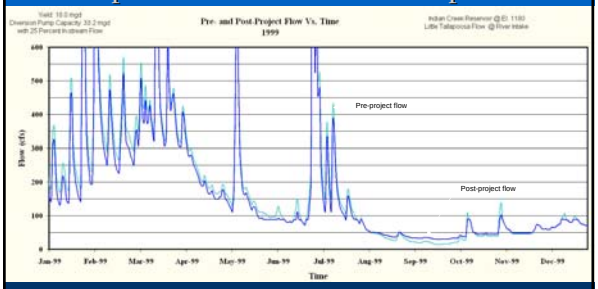
- River diversions supplement project yield
- Reservoirs typically sited on tributary streams (less environmental impacts)





Ending storage = initial storage + basin runoff + diversions – evaporation – water supply – in-stream flow from the reservoir

Sample Downstream Flow Impacts



Project Yield

- **Modeled sites using 25% of Minimum In-Stream Flow**
- **Each site will require pump diversion to meet the needed yield**
- **Project phases: 6mgd, 12mgd, 18mgd**

Impacts to Streams and Wetlands

- **Stream Impacts initially calculated using USGS Topographic Maps**
- **Wetland impacts initially calculated using Carroll County Soil Survey**
- **EcoSouth, Inc. field verified impacts on four short-listed sites using handheld GPS to refine estimates**
- **All four sites contain existing NRCS dams**

Garrett Creek

Garrett Creek

Existing NRCS Dam

Indian Creek

Indian Creek

Existing NRCS Dam

Indian Branch

Indian Branch

Existing NRCS Dam

Turkey Creek Trib

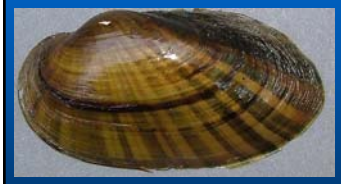
Turkey Creek

Existing NRCS Dam

Impacts to Threatened & Endangered Species

- **EcoSouth, Inc. performed preliminary field review of sites**
- **Gerry Dinkins performed a mussel survey at all intake sites**
  - **Little Tallapoosa River at Hwy 100**
  - **Little Tallapoosa River at confluence with Garrett Creek**
  - **Confluence of Indian Creek and Indian Branch**

T&E and Mussel Study



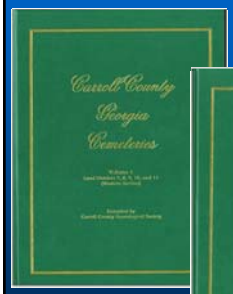
Villosa Vibex

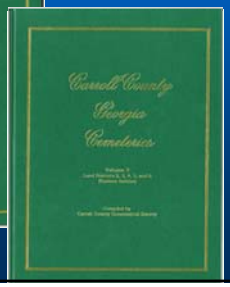
- **No state or federally listed endangered species found**
- **One native mussel species Villosa Vibex**

Impacts to Cultural Resources

- **Cultural Resources Literature Review performed by R.S. Webb & Associates**
  - **Required under Section 106 of the National Historic Preservation Act**
  - **To determine if state or federally recognized archeological sites or historic structures are affected**

Cemeteries





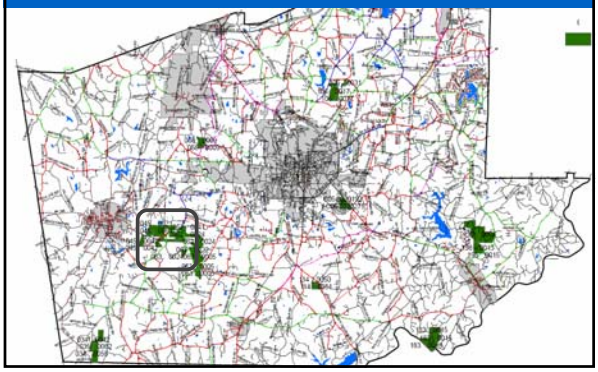
2005 Comprehensive List of All Cemeteries in Carroll County by Carroll County Genealogical Society

284 cemeteries in Carroll County

73 cemeteries in the vicinity of four reservoir sites (9^{th} and 10^{th} Land District)

No cemeteries found within any of the reservoir sites

Farmland Preservation areas near Garrett Creek



Costs to Consider

- Dam & Spillway
- Supply Pump Station
- Clearing/Grubbing
- Diversion Intake Pipe Station
- Diversion Pipelines
- Utility Relocations
- Road/Bridge Relocations
- Wetland Mitigation
- Stream Mitigation
- Land Acquisition
- Impacted Homes and Structures
- Administration Fees
- Contingency Fees

Phased Approach to Costs

- 6 mgd
- 12 mgd
- 18 mgd

Phased Pump Diversion at Indian Branch & Indian Creek

- For Indian Branch and Indian Creek sites, we evaluated pumped diversions from Indian Creek for the first phase (6 mgd)
- Cost savings for first phase
  - $9M to $11M for Indian Branch
  - $7M to $8M for Indian Creek
- New pump station would be required on the Little Tallapoosa for future phases

Cost Summary (in $millions)

	Indian Branch	Turkey Creek	Garrett Creek	Indian Creek
Phase I Cost (6mgd)	$65	$71	$86	$55
Phase II Cost (12mgd)	$12	$10.4	$7.2	$15
Phase III Cost (18mgd)	$24	$19	$12	$22
TOTAL COST	$112	$100	$106	$100
Cost per Billion Gal of Storage	$16.7	$14.1	$14.1	$10.6
Cost per Million Gal of Yield	$6.2	$5.5	$5.8	$5.5

Alternatives Analysis Summary

	Indian Branch	Turkey Creek Trib	Garrett Creek Trib	Indian Creek
Size (acres)	649	674	665	614
Storage (billion gallons)	6.7 BG	7.1 BG	7.5 BG	9.4 BG
Yield w/pumping	18 mgd	18 mgd	18 mgd	18 mgd
Length of pump lines	34,215 ft	25,299 ft	9,600 ft	52,349 ft
Stream impacts	36,437	39,239	31, 460	45,706
Wetland impacts	7.25	6.5	11.5	30.7
Endangered Species	None	None	None	None
Road closures	3 Roads	6 Roads	4 Roads	2 Roads
Road / Pipeline relocations				Gas pipeline
Number of Parcels impacted	39	45	61	44
Cultural Resources impacted	High probability 5 historic structures	Moderate probability 7 historic structures	High probability 9 historic structures/potential for NRHP	No found archeological sites No historic structures 150ft
Homes in Normal & Flood Pool	18	11	22	3
Other buildings in pool	27	8	25	7
TOTAL COST	$112 mill	$100 mill	$106 mill	$100 mill
Phase I Cost (6mgd)	$65 mill	$71 mill	$86 mill	$55 mill
Cost per Bill Gal of Storage	$16.7 mill	$14.1 mill	$14.1 mill	$10.6 mill

Documents Required to Submit Section 404 Permit to Corps

- **Complete Documentation:**
  - **Purpose and Needs Analysis**
  - **Alternatives Analysis and Preferred Site**
  - **Preliminary engineering plans and specs**
  - **Impacts to Wetlands and Streams**
  - **Mitigation Plan**
  - **Location – Site Maps**
  - **Supporting Studies**
    - **Cultural Resources Survey (Phase I)**
    - **Endangered Species Survey**

What's Next?

Selection of Preferred Alternative