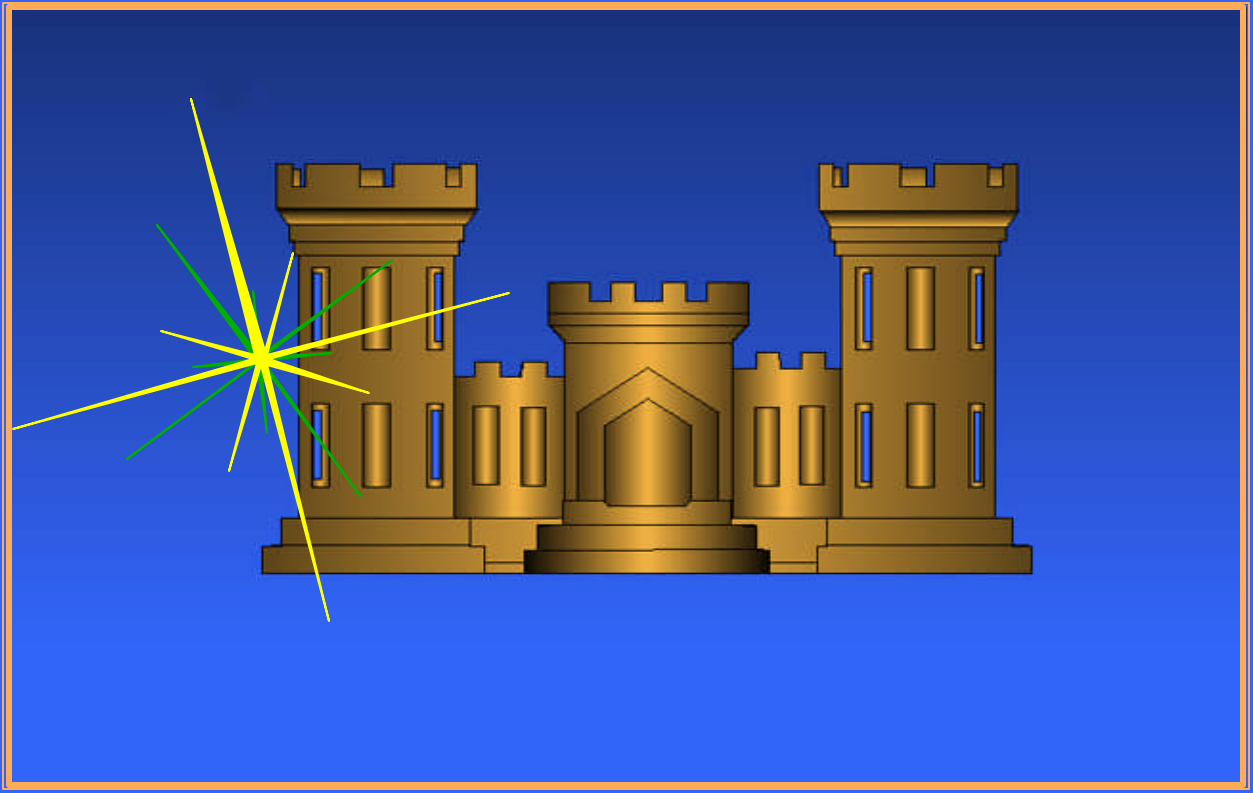
CORPS OF ENGINEERS



Water Management in the ACT and ACF Basins

Authority for Water Control Operations

- Congressional authorization for Federal reservoir projects
- "Blanket" congressional authorizations which apply to all Federal reservoir projects
  - Fish and Wildlife Coordination Act of 1958 (P.L. 85-624)
  - Flood Control Act of 1944 (P.L. 78-534)
  - Water Supply Act of 1958 (P.L. 85-500)
  - Federal Water Pollution Control Act Amendments of 1972 (P.L. 92-500)
  - Endangered Species Act of 1973 (P.L. 93-205)
  - Water Resource Development Acts provisions
- Corps regulation in support of Flood Control and Navigation for non-Federal projects (FERC license, MOAs, etc.)

Regulatory Guidance

Engineering Regulations:

- ER 1110-2-240 – Water Control Management
- ER 1110-2-8156 – Preparation of Water Control Manuals
- ER 1110-2-1941 – Drought Contingency Plans

Engineering Manuals:

- EM 1110-2-3600 – Management of Water Control Systems

Other applicable guidance

http://www.usace.army.mil/publications/eng-regs/cecw.htm

ENGINEER REGULATIONS - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Address http://www.usace.army.mil/publications/eng-regs/cecw.htm Go

Links Customize Links Free Hotmail Windows Media Windows RealPlayer

[USACE] [Up to Publications] [Bottom of Page] [Search] [Help, POC List]

Civil Works
Engineer Regulations

PUB.NUMBER	PAGES	CD ROM	PROPONENT	TITLE	PUB.DATE
ER 1-2-2	003		CECW-PL	Water Resources Policies and Authorities Substantive Congressional Contacts (RCS: CECW-P-21)	01 Jul 91
ER 5-1-10	003		CEMP-MP/CECW-EP	Corps-wide Area of Work Responsibility	30 Sep 97
ER 11-1-320	34		CECW-OE	Civil Works Emergency Management Programs	1 Oct 98
ER 11-2-101	281		CECW-B	Army Programs - Civil Works Activities CH 1-24	01 Aug 64
ER 11-2-201	017		CECW-B	Civil Works Activities - Funding, Work Allowances, and Reprogramming (RCS: CECW-B-11)	31 Aug 95
ER 11-2-220	043		CECW-B	Civil Works Activities General Investigation (RCS: DAEN-CWB-12)	29 Jul 77
ER 11-2-240	019		CECW-B	Civil Works Activities - Construction & Design (RCS: DAEN-CWB-20), ENG Form 2200, ENG Form 2201A, ENG Form 2204-R, ENG Form 2205A	06 Aug 96
ER 11-2-290	005		CECW-BA	Civil Works Activities, General Expenses (RCS: DAEN-CWB-20)	31 Jul 86
ER 15-1-36	004		CEMP-EC/CECW-LC	Committee on Cost Engineering	15 Oct 91
ER 15-1-41	005		CECE-E/CEMP-E	Corps of Engineers Specifications Steering Committee (CSSC)	24 Dec 98
ER 15-2-2	005		CECW-M	Foreign-Trade Zones - Establishment, Operation Maintenance and Administration	30 Jul 82
ER 15-2-13	002		CECW-EH	Mississippi River Water Control Management Board	10 May 89
ER 15-2-14	008		CECW-EH-D	Committees on Tidal Hydraulics, Channel Stabilization, Water Quality and Hydrology	24 Apr 92
ER 25-2-1	016		CECW-BD	Annual Report of the Secretary of the Army on Civil Works Activities (RCS: CONG-1006)	30 Sep 97
ER 37-2-18	001		CECW-EH	Collection of Project Funds for Operation of Hydrologic Programs	29 Oct 99

Internet

Water Control Plans

- Required for reservoirs, locks and dams, and reregulation structures
  - Regulation schedules for project and system regulation
  - Basin data collection, analysis & dissemination
  - Assure project safety
  - Regulation of project in an appropriate manner

Reservoir Regulation Schedules

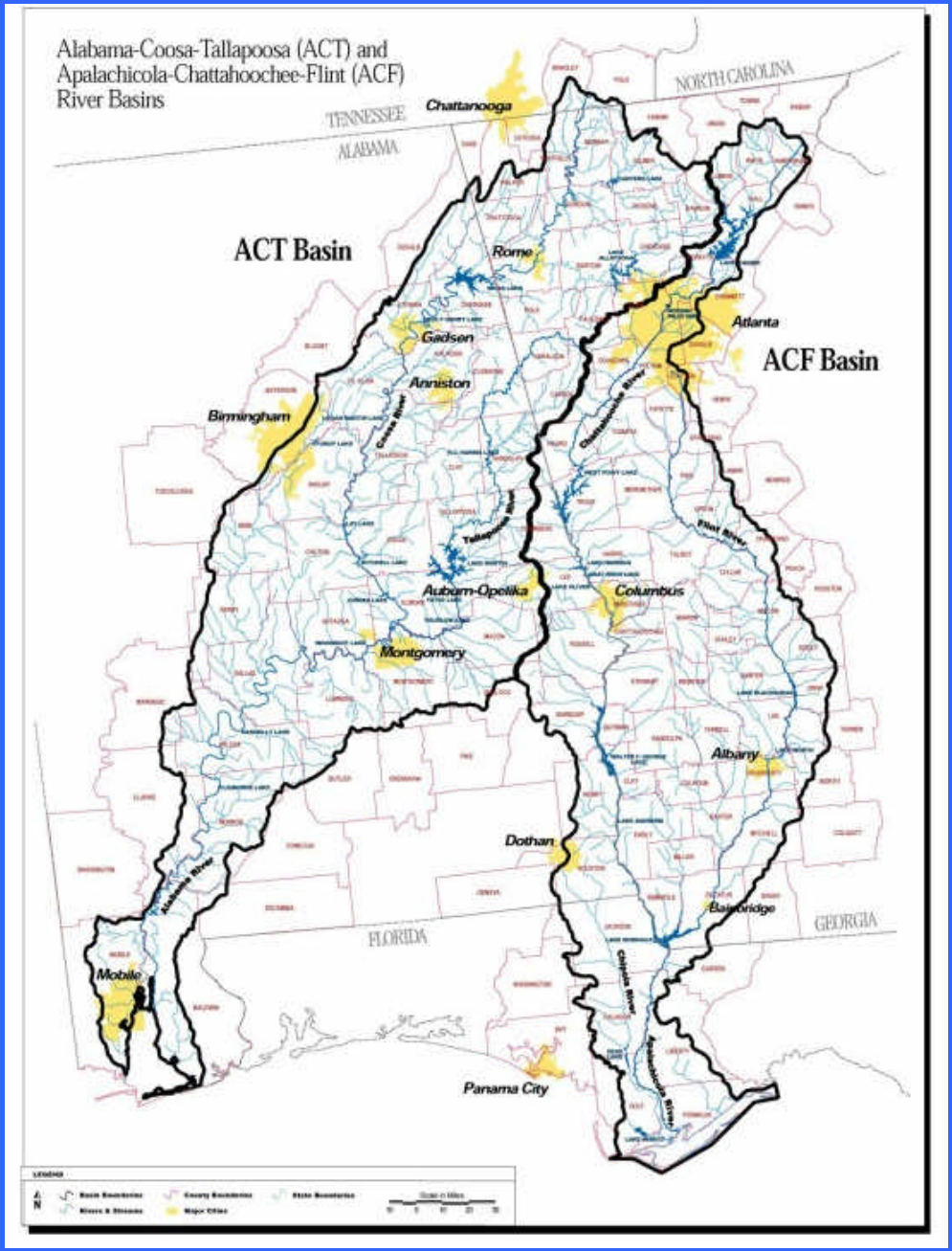
- Operating criteria, guidelines and rule curves
- Specifications for storage and releases

Water Control Development Process

- Infrastructure and Water Management
- Operational Scenarios
- Water Control Plan Development

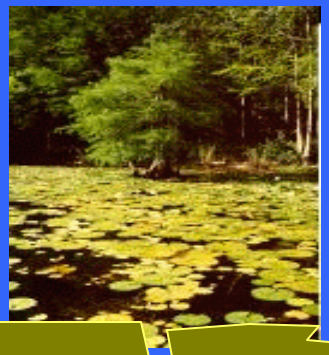
Water Control Development Process

- Infrastructure and Water Management


Alabama-Coosa-Tallapoosa (ACT) and
Apalachicola-Chattahoochee-Flint (ACF)
River Basins
TENNESSEE
ALABAMA
NORTH CAROLINA
FLORIDA
GEORGIA
ACT Basin
ACF Basin
Chattanooga
Rome
Gadsen
Anniston
Birmingham
Atlanta
Auburn-Opelika
Montgomery
Columbus
Albany
Dothan
Bainbridge
Mobile
Panama City
Coosa River
Tallapoosa River
Chattahoochee River
Flint River
Alabama River
Chipola River
Apalachicola River

Water Management

Water Quality



Flood Control

Hydropower

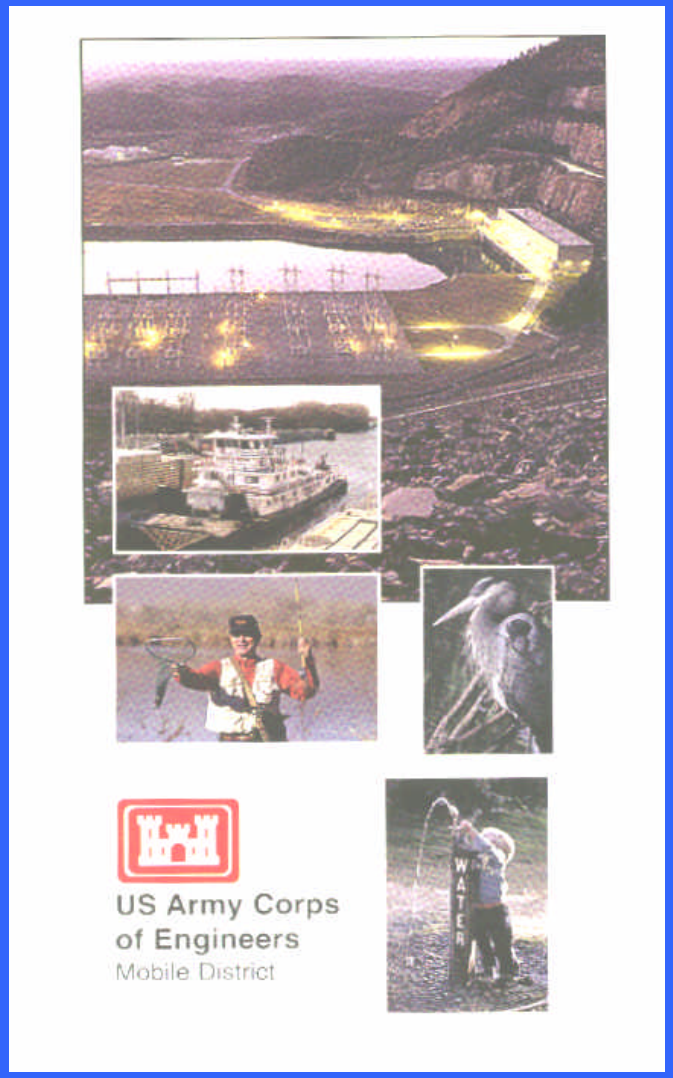
Navigation

Recreation

Municipal & Industrial

Water Management of Water Resources

- Conduct water management activities
- Supervise flood control
- Technical assistance
- Coordinate with National Weather Service and provide information to District elements
- Operation of rainfall and river reporting network
- Maintain reservoir data



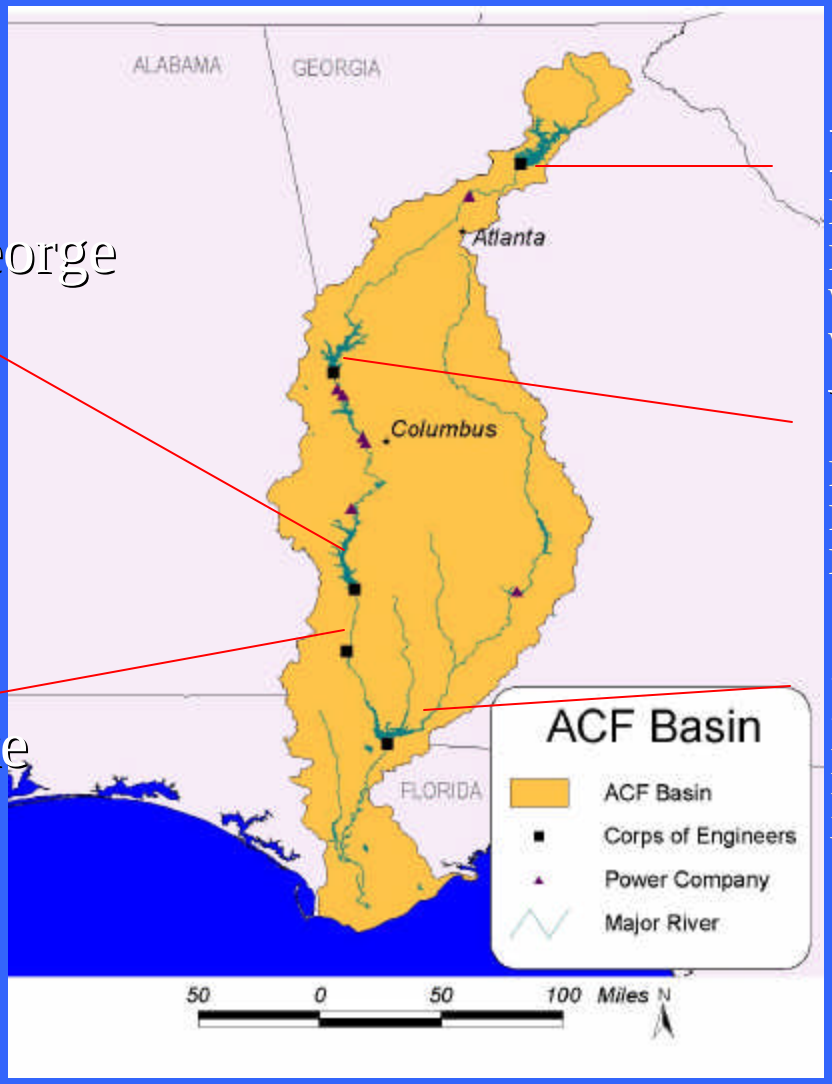
ACF River System

Walter F. George Lake

Hydroelectric Power
Navigation
Recreation
Fish/Wildlife
Water Quality

George W. Andrews Lake

Navigation
Water Quality
Recreation



Lake Sidney Lanier

Hydroelectric Power
Navigation
Recreation
Flood Control
Water Supply
Fish/Wildlife
Water Quality

West Point Lake

Flood Control
Recreation
Fish/Wildlife
Navigation
Hydroelectric Power
Water Quality

Lake Seminole

Hydroelectric Power
Navigation
Recreation
Fish/Wildlife
Water Quality

ACT River System

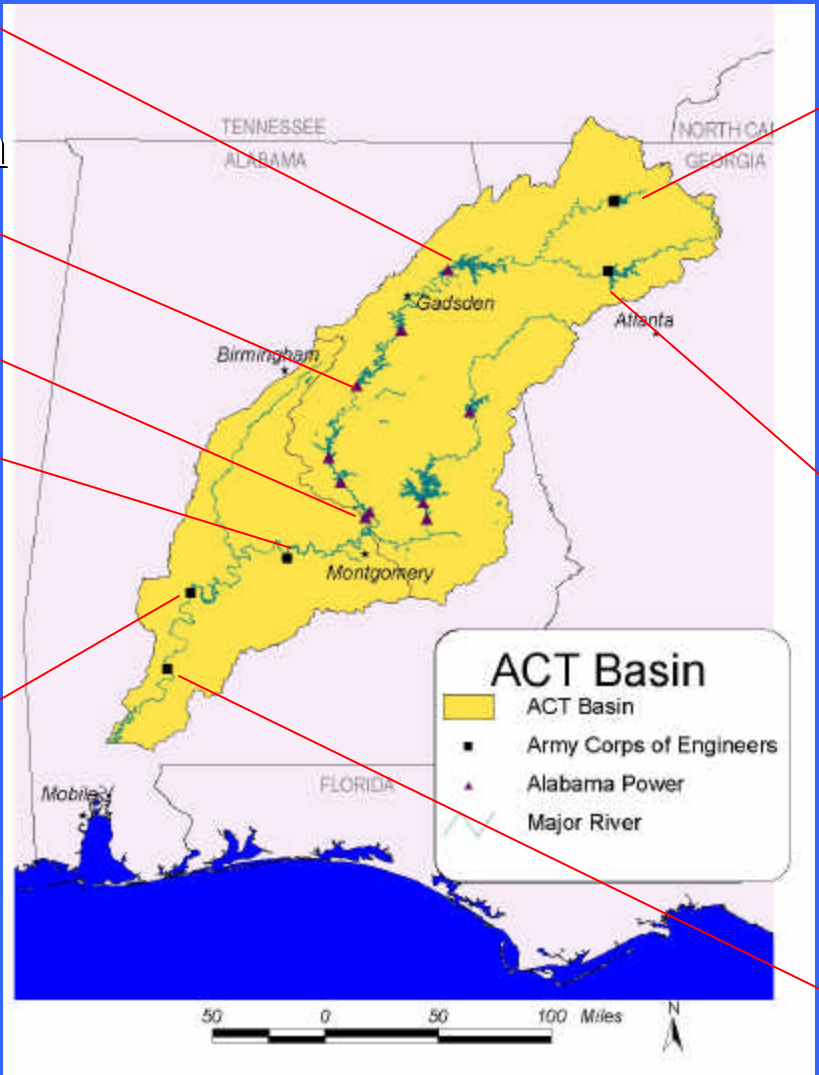
APC Weiss Dam
Flood Control

APC Logan Martin Dam
Flood Control

APC Jordan Dam
Flood Control

R.F. Henry
Hydroelectric Power
Navigation
Recreation
Fish/Wildlife
Water Quality

Millers Ferry
Hydroelectric Power
Navigation
Recreation
Fish/Wildlife
Water Quality



Carters Lake
Recreation
Flood Control
Navigation
Fish/Wildlife
Water Quality
Hydroelectric Power
Water Supply

Lake Allatoona
Hydroelectric Power
Navigation
Recreation
Flood Control
Water Supply
Fish/Wildlife
Water Quality

Claiborne
Navigation Recreation
Fish/Wildlife
Water Quality

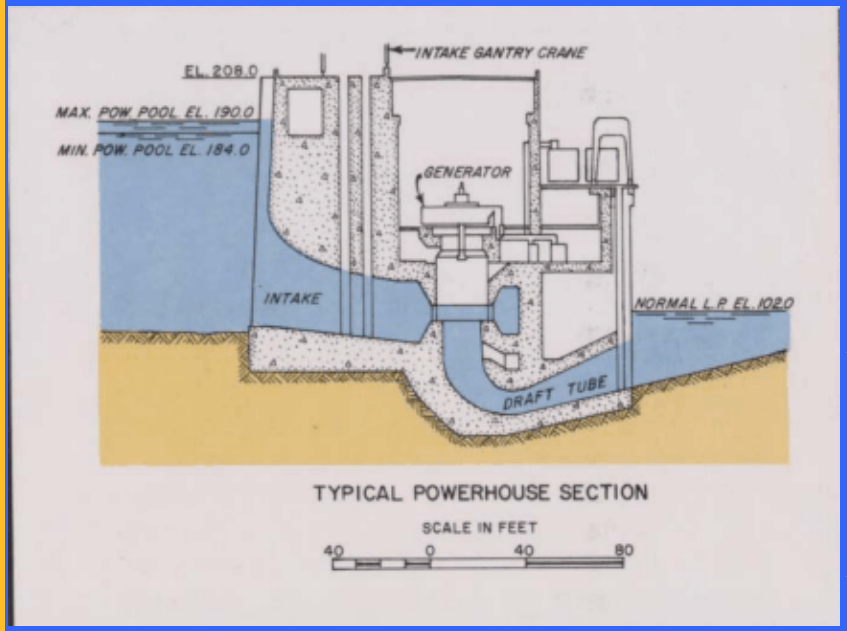
Navigation

- Make releases to maintain the specified channel depth for commercial navigation.
- When dry conditions occur use water from storage to support limited navigation.

Flood Control

- Winter drawdown of lakes to prepare for flood season.
- Store water in lake during flood event
- Monitor downstream points for impacts of flooding.
- Evacuate water as quickly as practicable when downstream conditions allow to prepare for next event.

Hydropower



- Determine weekly generation based on monthly contract requirements and current project storage.
- Southeastern Power Administration (SEPA) makes actual daily generation schedule.
- Adjustments to schedule made as needed with input from Corps.
- Generation incidental benefit when releases made for other purposes.

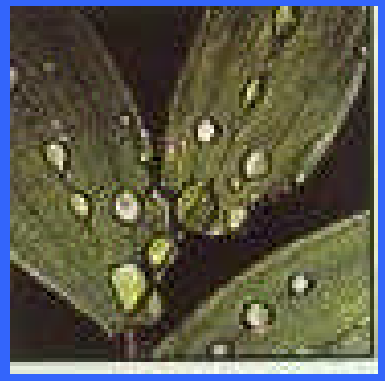
Recreation

- Maintain lakes as full as possible according to Water Control Plan
- Adjust water levels to accommodate special activities on the lakes.
- Make special releases for recreational activities downstream.

Environmental & Water Quality

- Support for fish spawning and other fish and wildlife conservation measures.

- Coordinate releases and levels to enhance water quality and environmental needs.

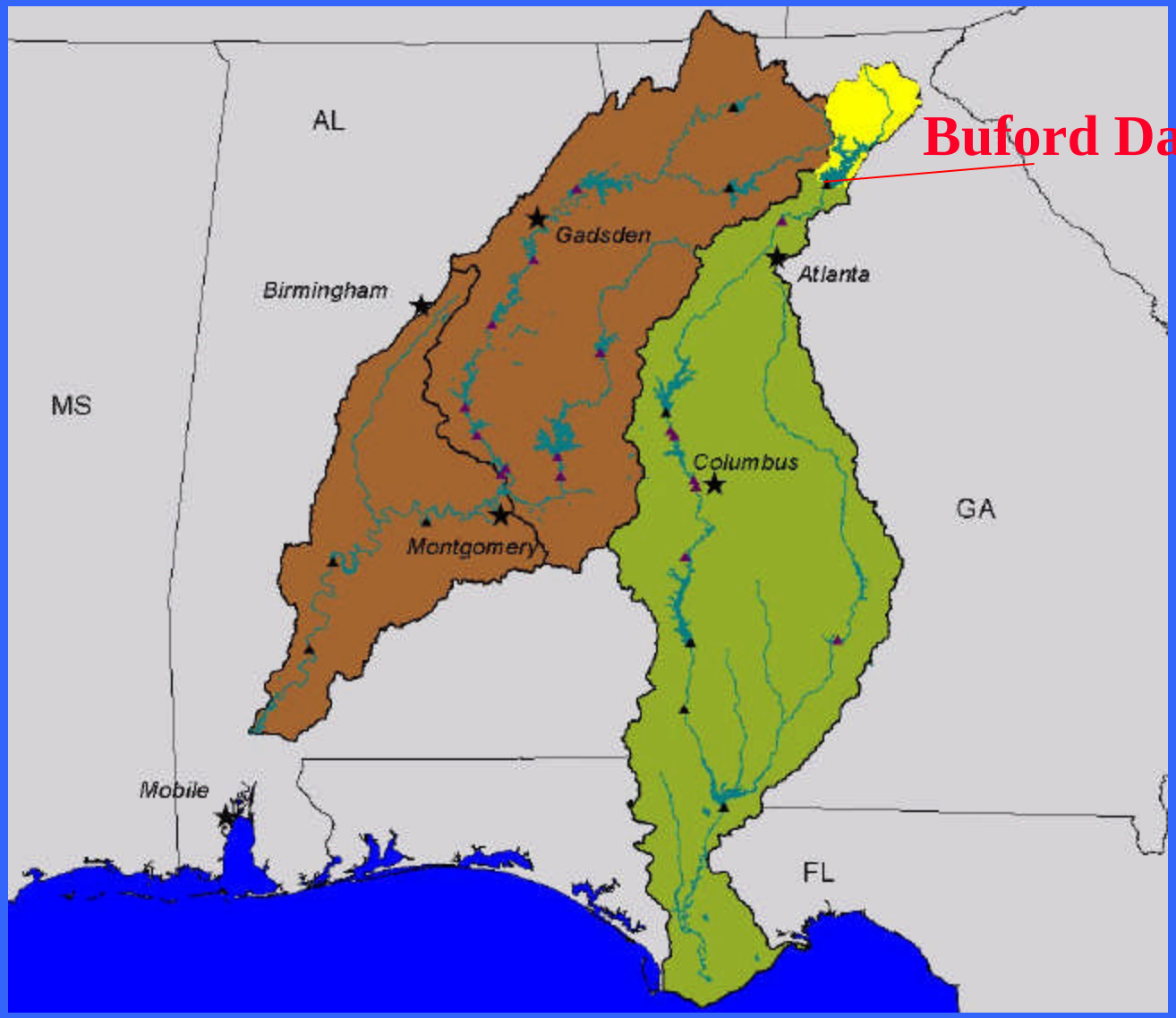


- Provide releases to meet downstream water quality targets.

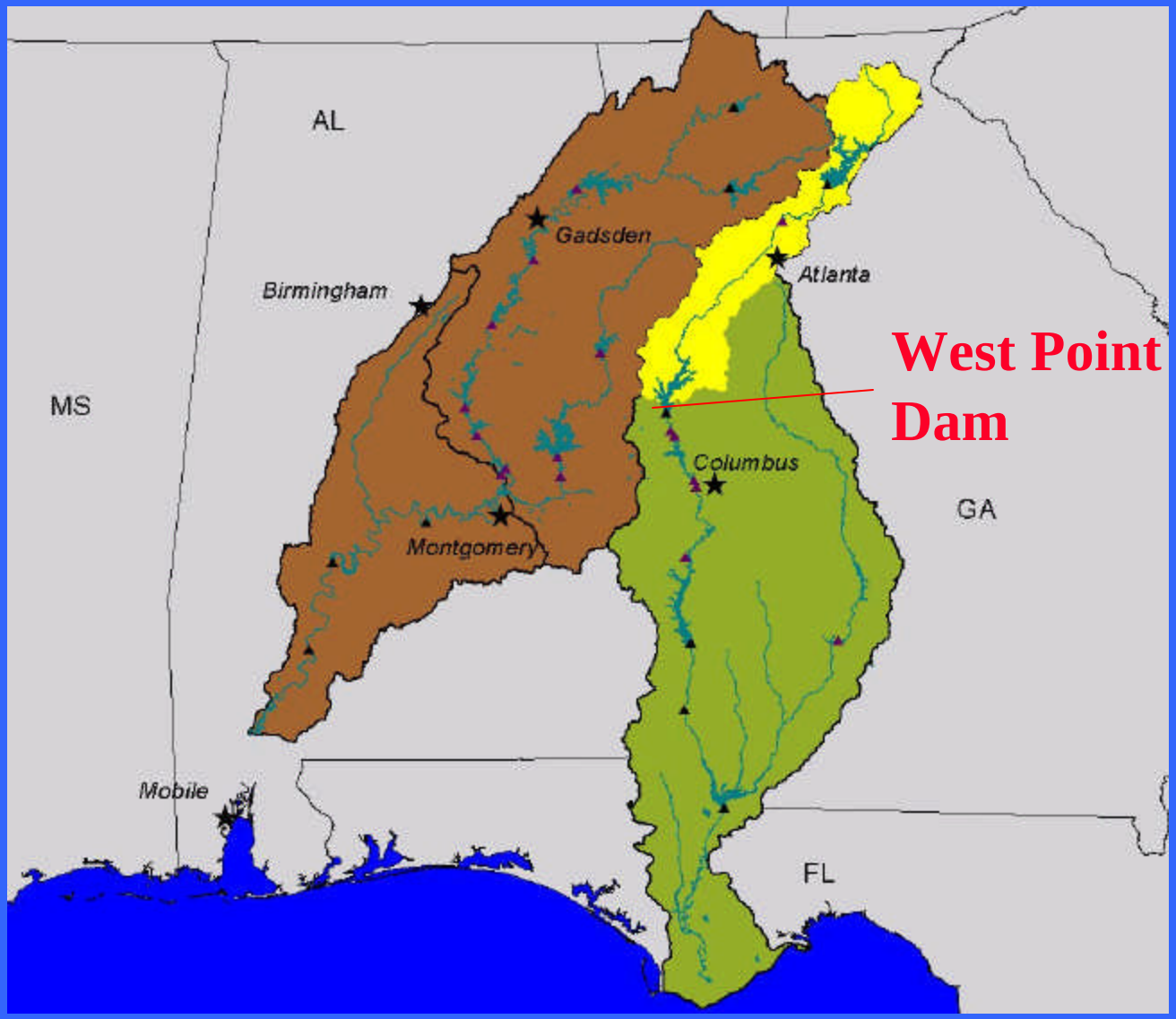
Municipal and Industrial

- Provide water supply for industries and municipalities.
- Provide water for wastewater dilution.

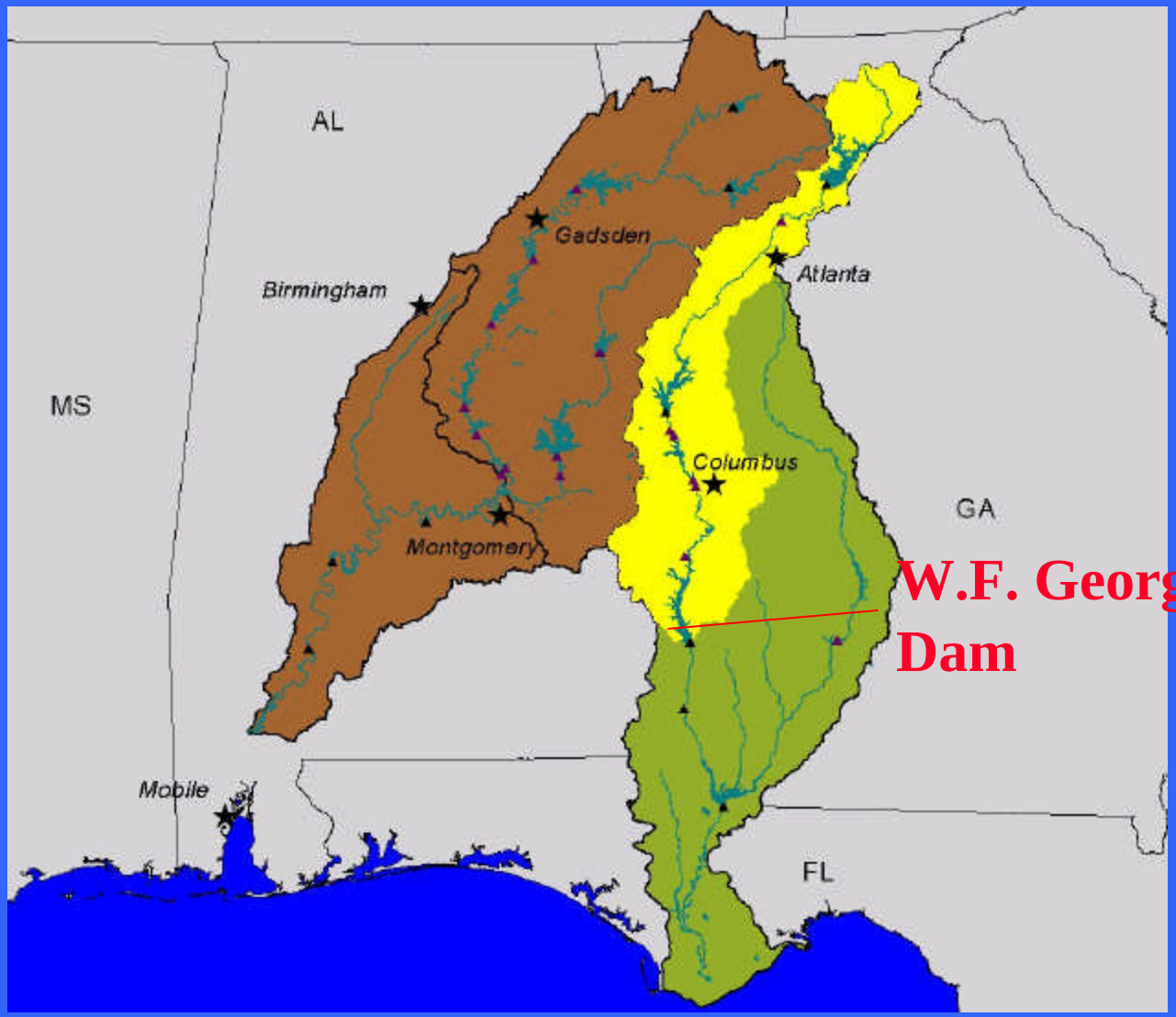
Lake Lanier Drainage Basin



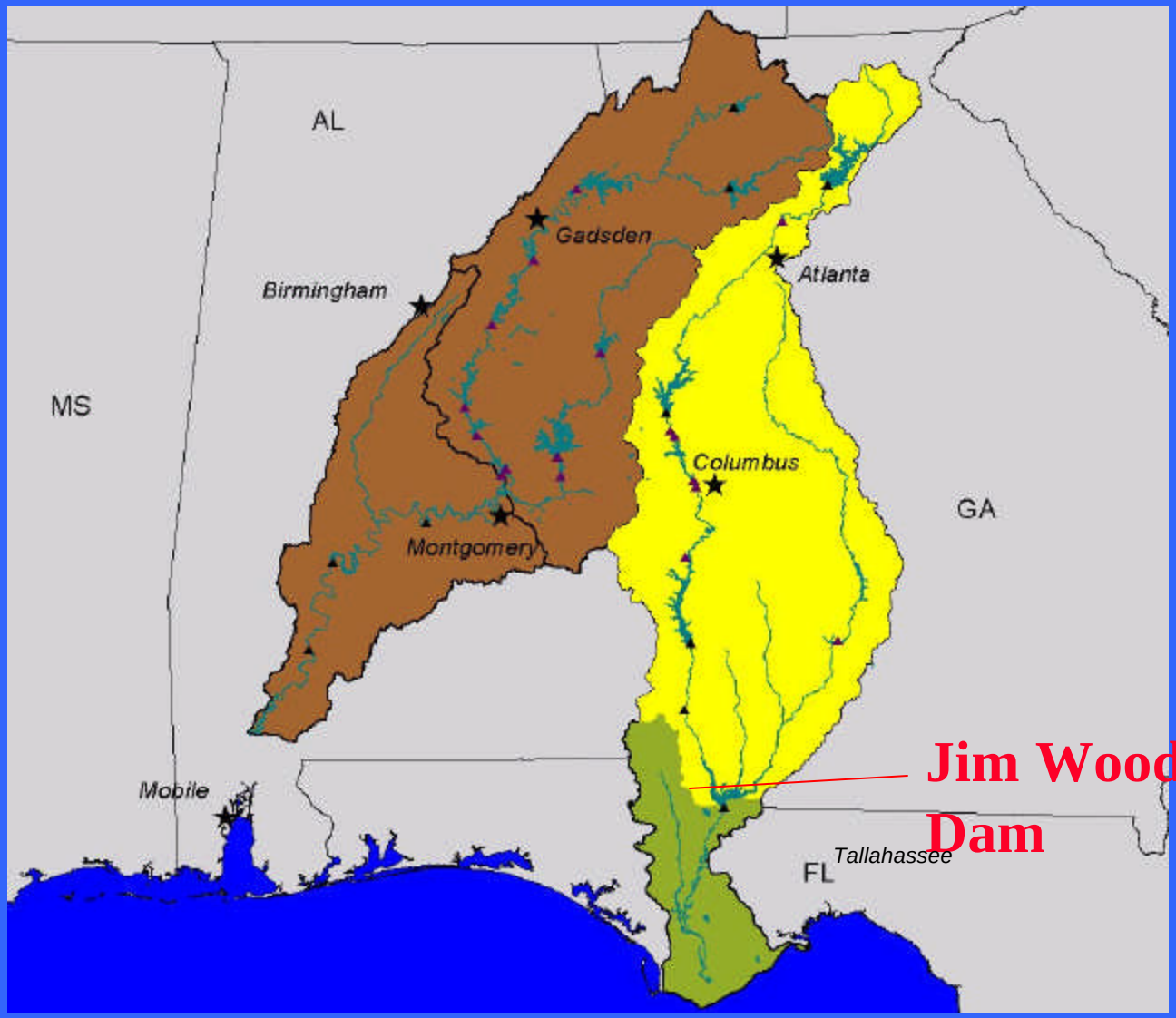
West Point Drainage Basin



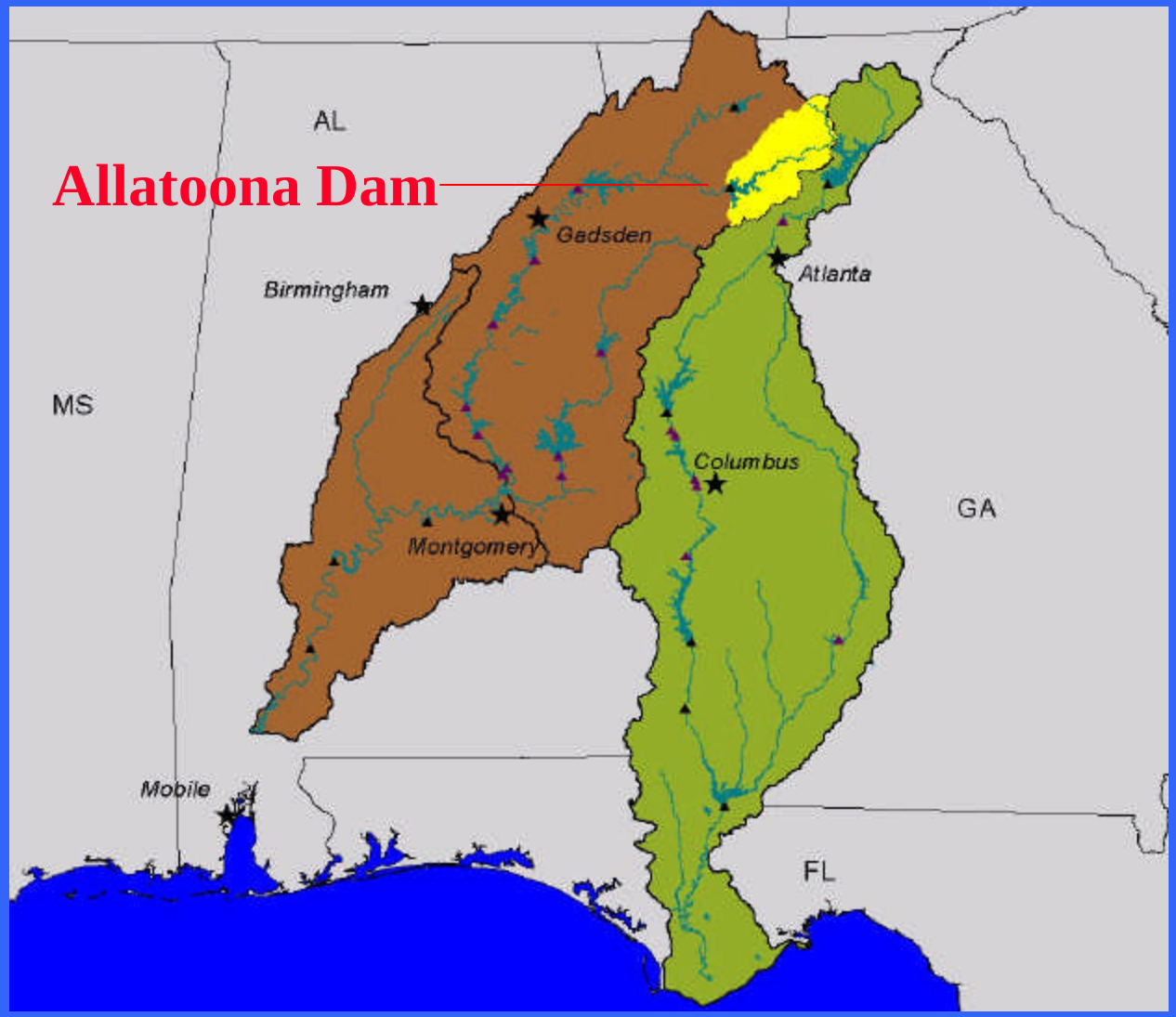
W.F. George Drainage Basin



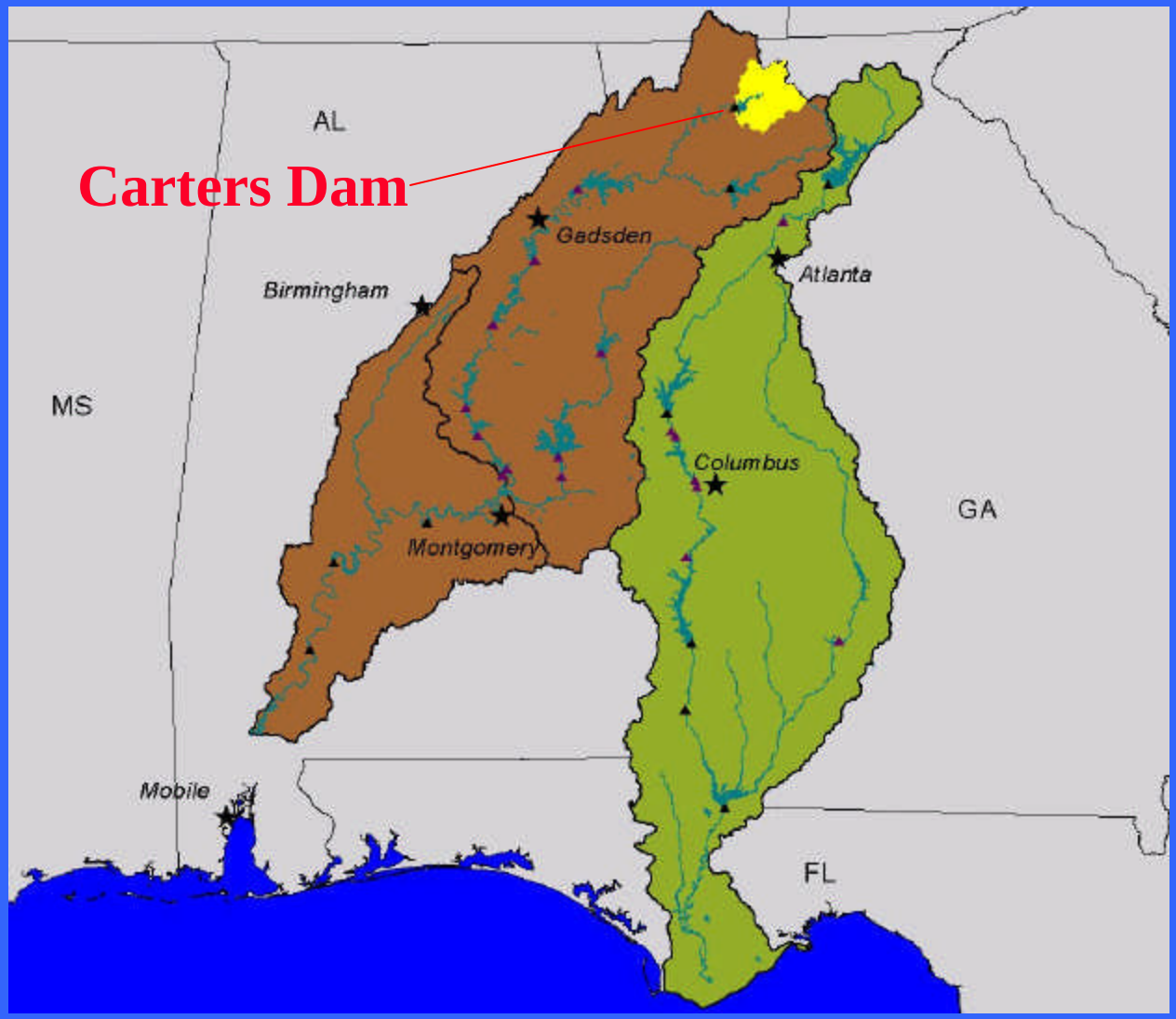
Jim Woodruff Drainage Basin



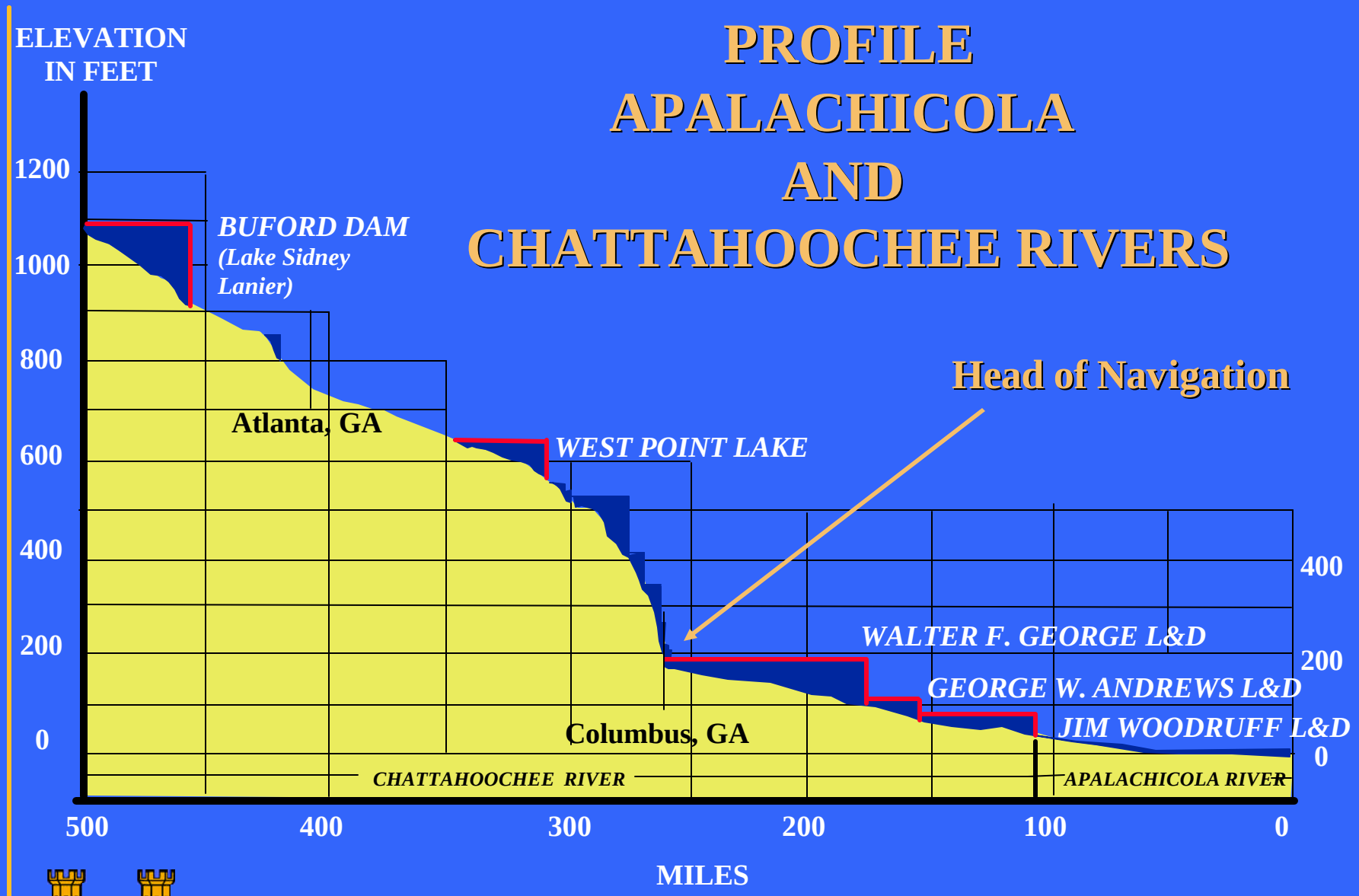
Allatoona Drainage Basin



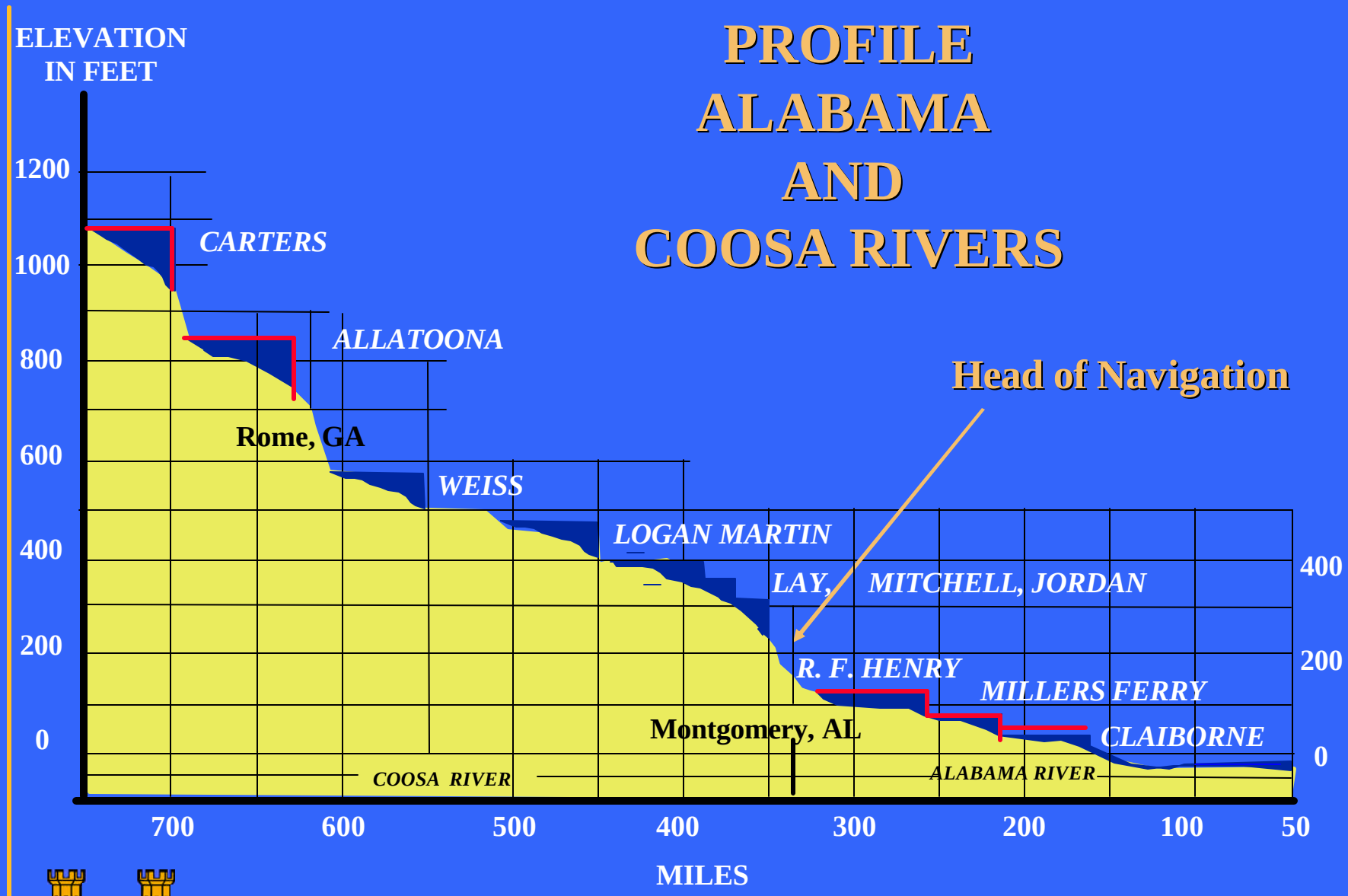
Carters Drainage Basin



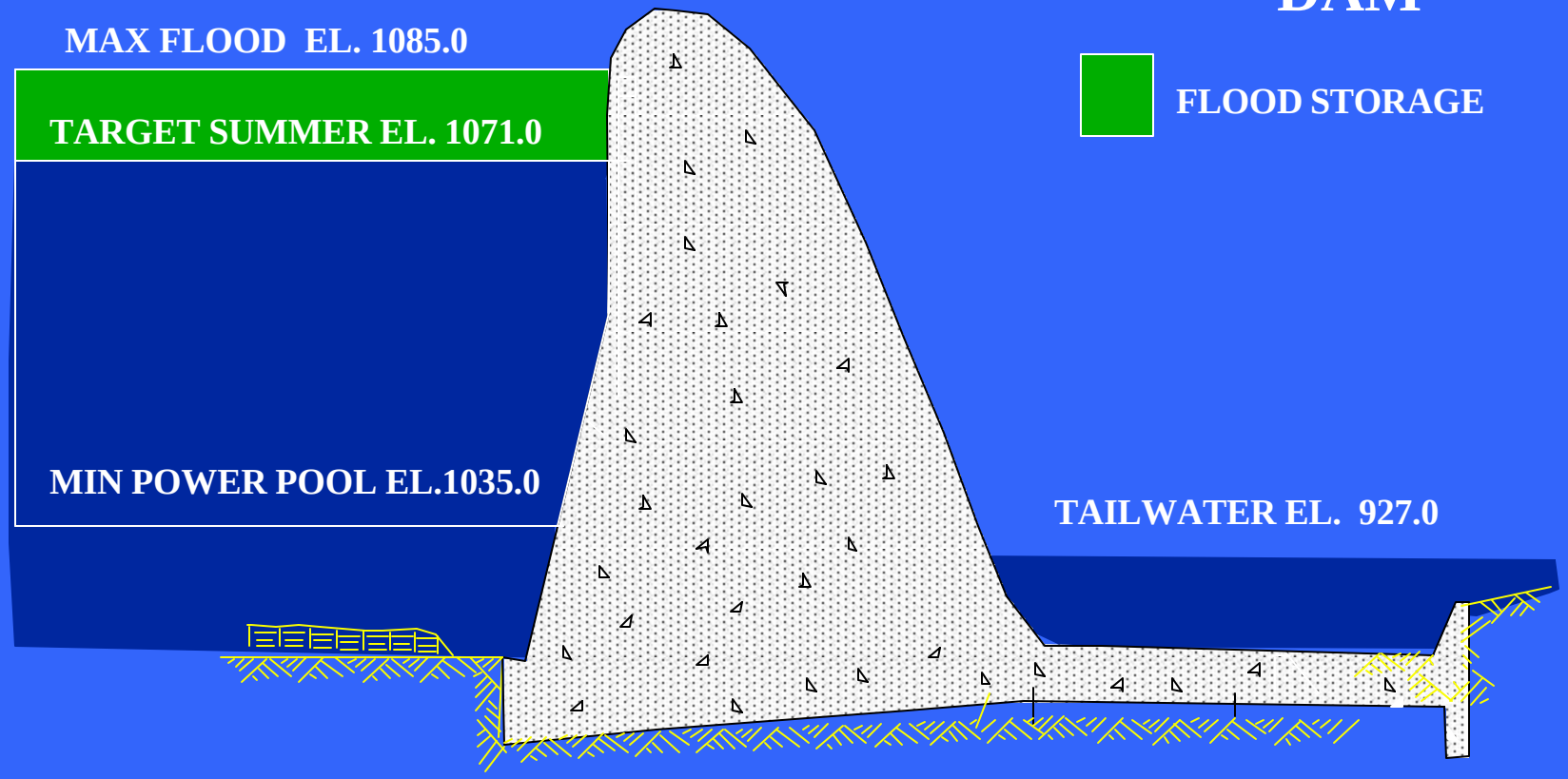
PROFILE APALACHICOLA AND CHATTAHOOCHEE RIVERS



PROFILE ALABAMA AND COOSA RIVERS

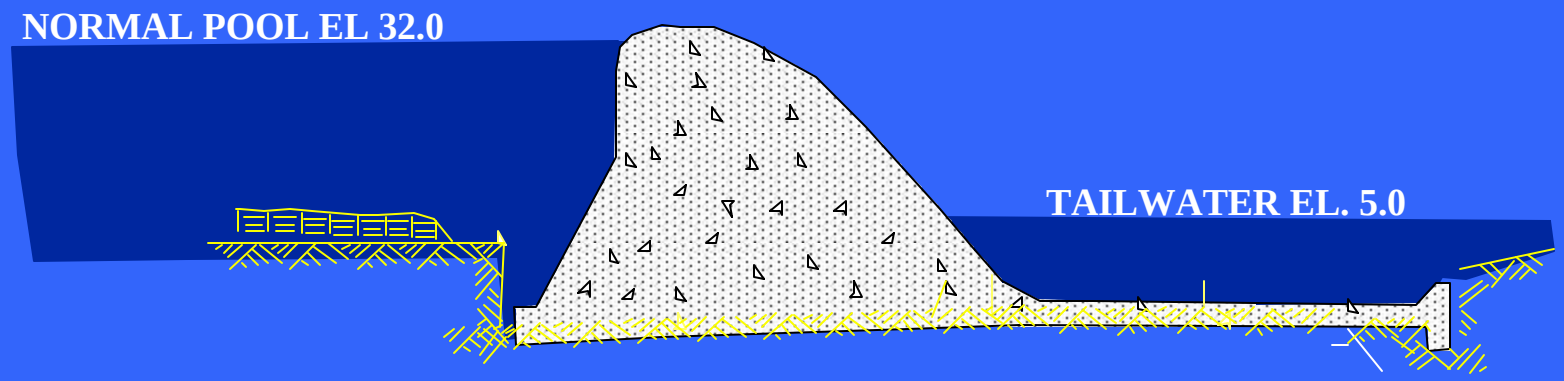


BUFORD DAM

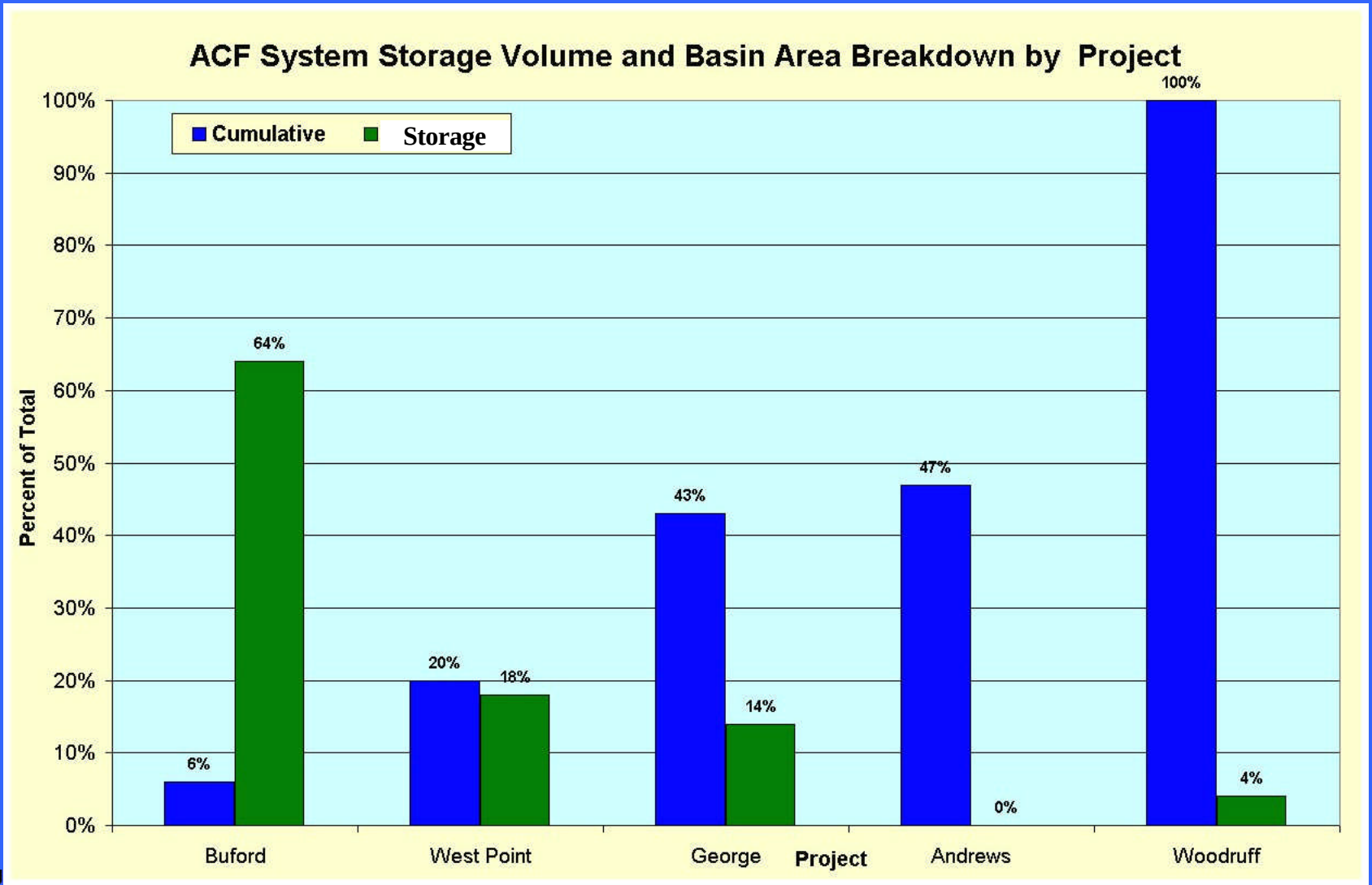

MAX FLOOD EL. 1085.0
TARGET SUMMER EL. 1071.0
MIN POWER POOL EL.1035.0
TAILWATER EL. 927.0
FLOOD STORAGE

CLAIBORNE DAM

NO FLOOD STORAGE

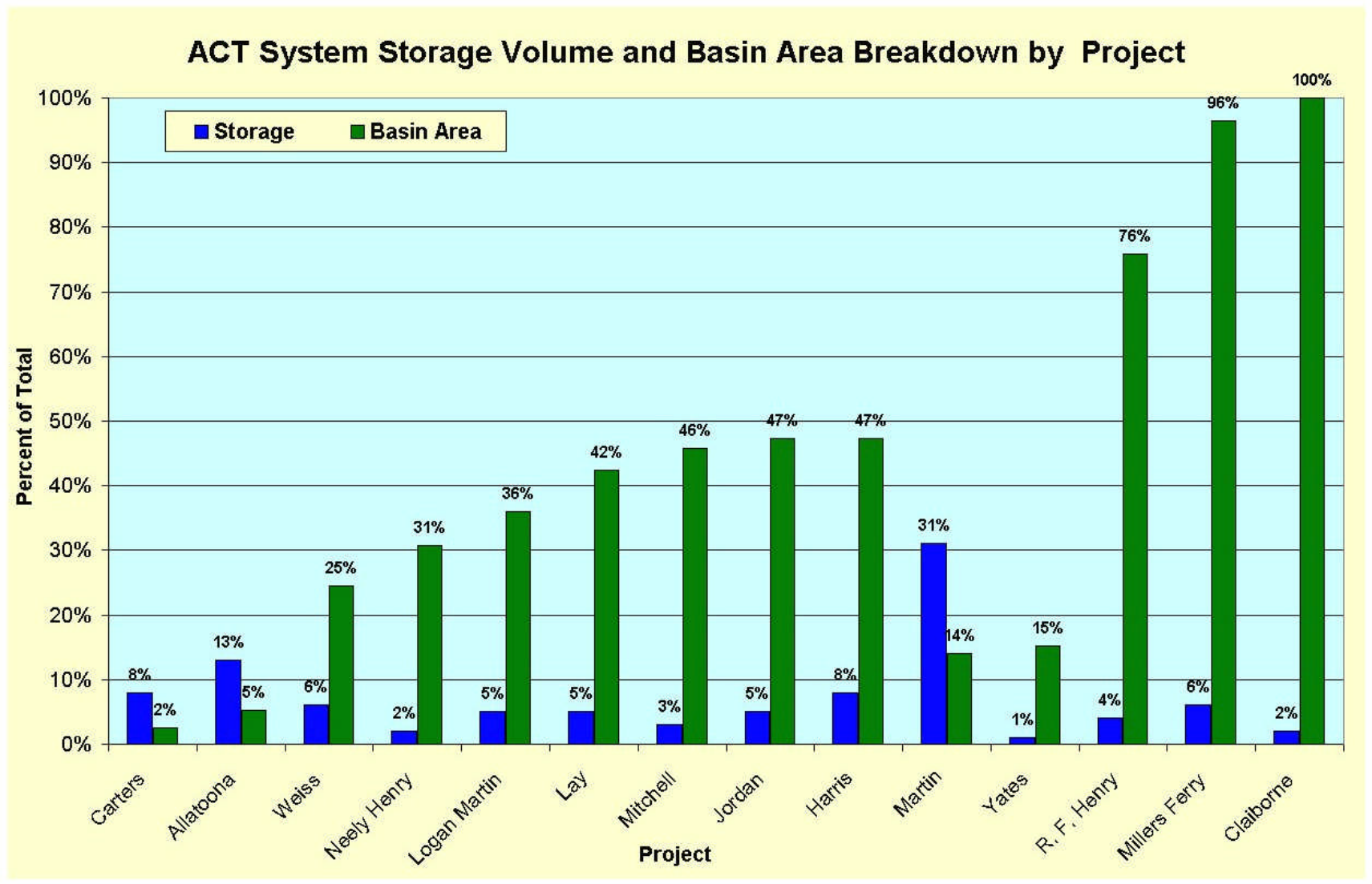


Drainage & Storage in ACF Basin



Note: Statistics computed using summer pool levels

Drainage & Storage in ACT Basin



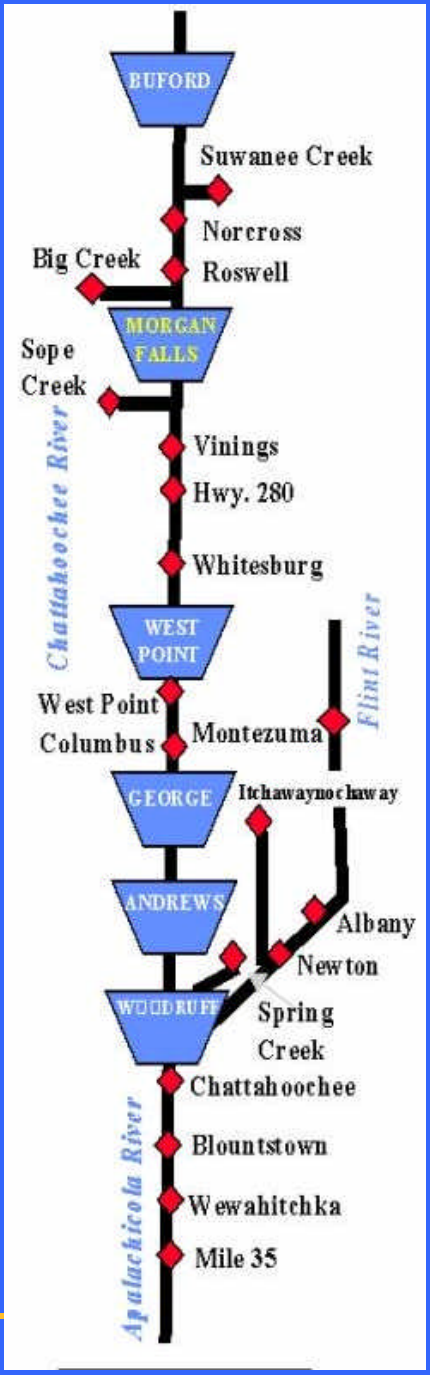
Note: Statistics computed using summer pool levels

Data Exchange Among Agencies

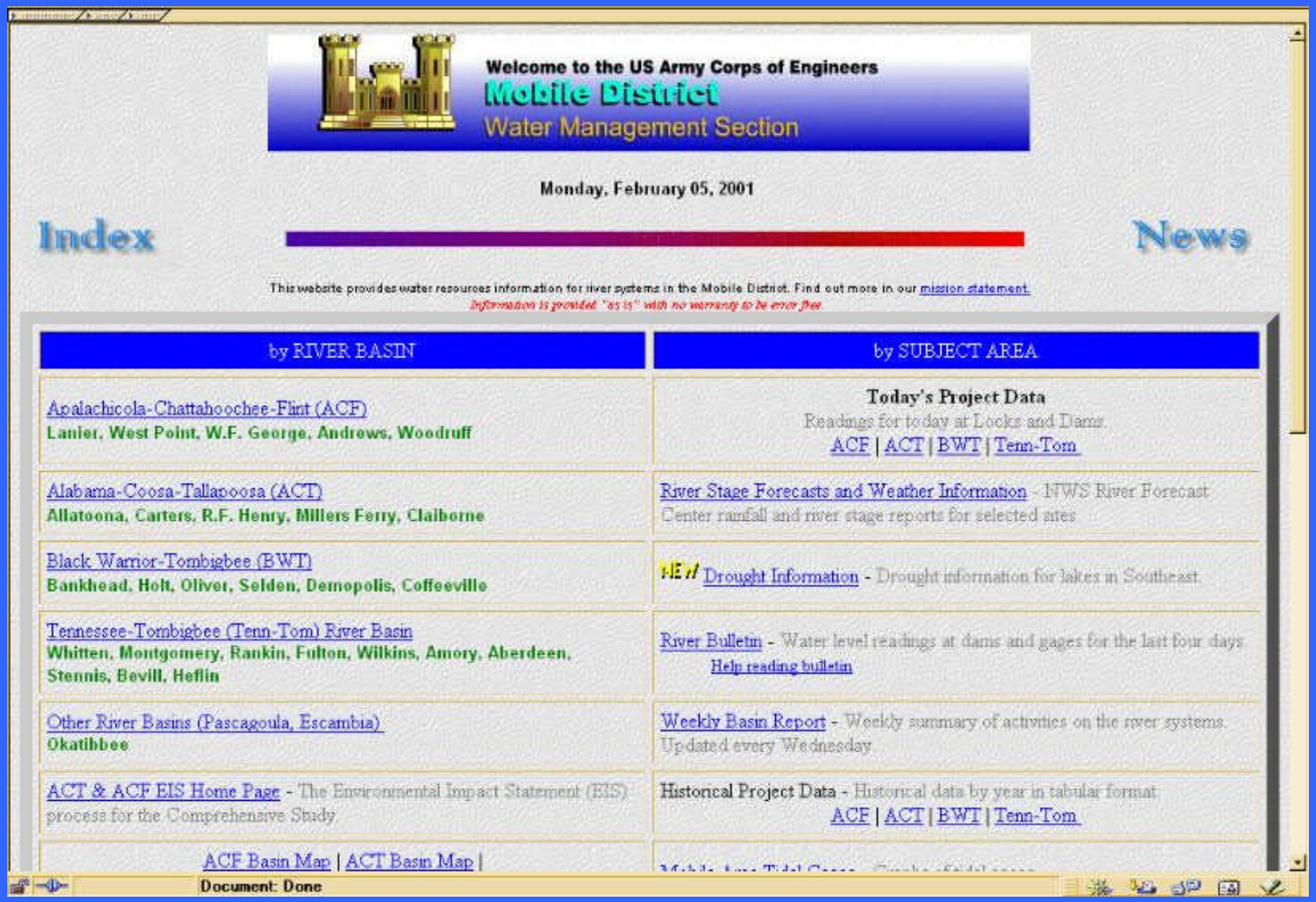
- National Weather Service (NWS)
- South East River Forecast Center (SERFC)
- Atlanta Regional Commission (ARC)
- Southeastern Power Administration (SEPA)
- State & County Emergency Management Offices
- U.S. Geological Survey (USGS)

Data Collection/ Dissemination

- Data collected from stream and rainfall gages and dams daily, hourly
- Rainfall and forecast data received from NWS
- Project and gage data sent to other agencies
- Data posted to Water Management's web page
- Other data and information provided to public via interactive voice system, e-mail, fax, and phone



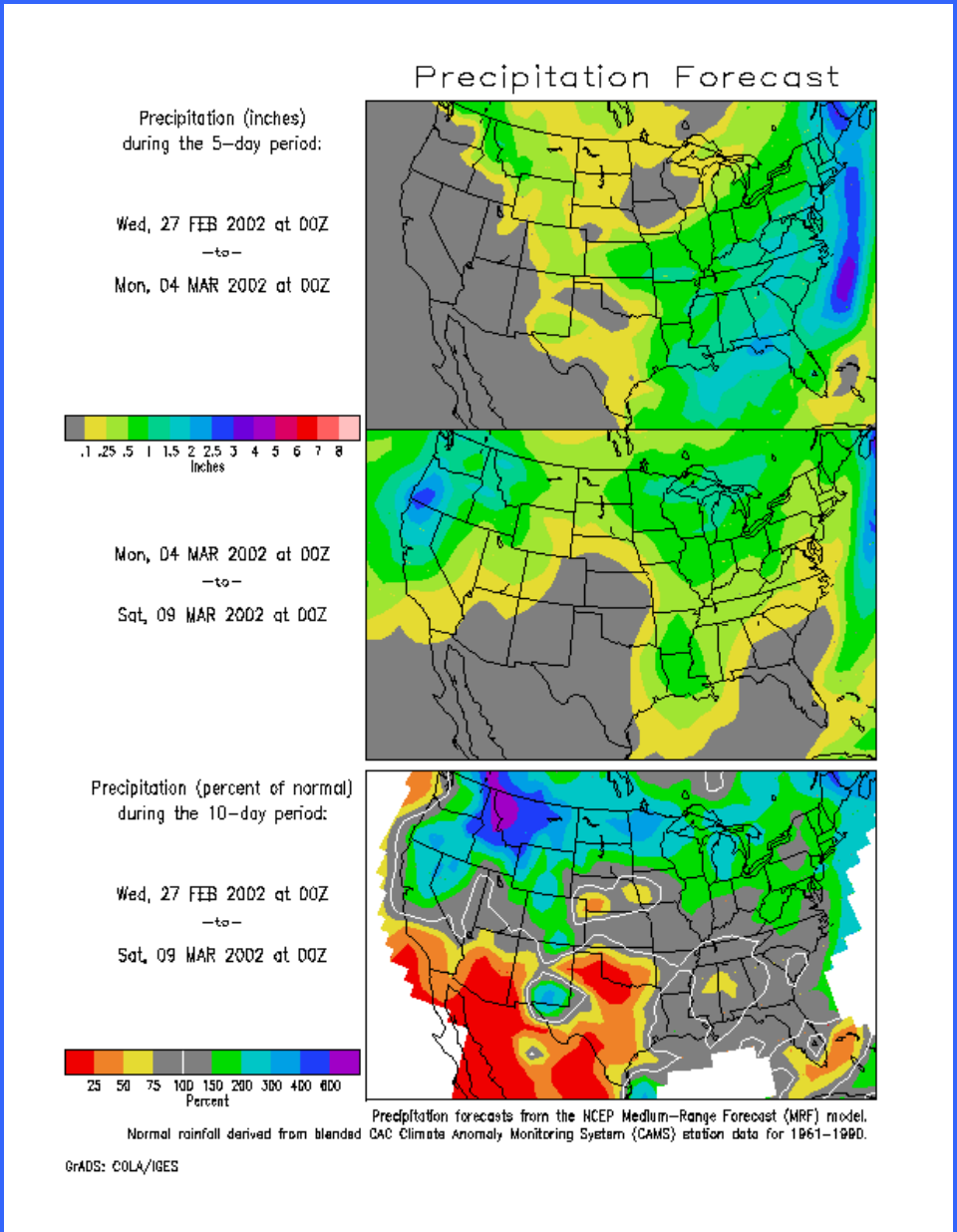
Data Dissemination



http://water.sam.usace.army.mil

Rainfall Information

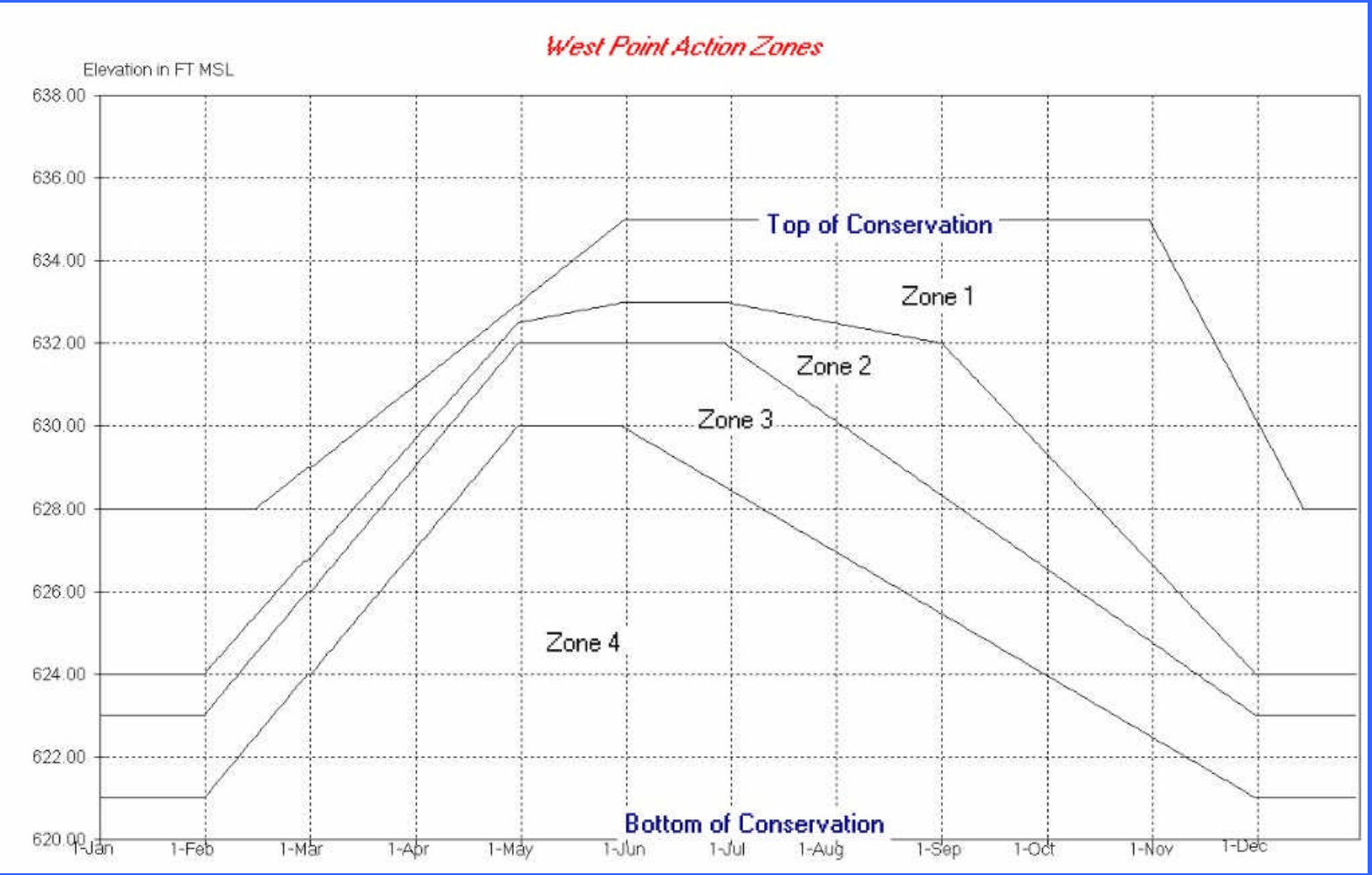
5-Day & 10-Day Precipitation Forecasts



Meteorological & Forecast Information

- Meteorologist on Water Mgt. staff
- National Weather Service
- River Forecast Center
- Other Weather Products

Water Control Plan



- Use Zones to balance purposes

Weekly Coordination Meeting

Water Management

Recreation

Navigation

Hydropower

Environmental

Public Affairs

Other Agencies
(when necessary)

Water Control Development Process

- Operational Scenarios

Operations During Normal Conditions

January through March

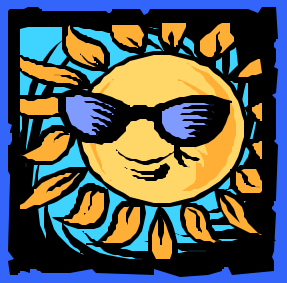
- Lakes held near winter level to provide sufficient flood storage
- Basin inflows at highest levels
- Fish spawn levels monitored
- Flood events evacuated from storage as quickly as practicable
- Navigation supported
- Power generation requirements met
- Water quality and water supply targets met

Operations During Normal Conditions

April through June

- Lakes begin to fill to summer level, flood threat diminished
- Basin inflows begin to level off
- Peak fish spawn completed
- Navigation supported with some releases from lake storage
- Power generation requirements met
- Water supply and water quality needs met

Operations During Normal Conditions



July through September

- Lakes at summer level, peak recreation season
- Basin inflows dependent upon summer rainfall events
- Lakes may decline some as other project purposes met
- Water quality and water supply targets closely monitored
- Navigation may be limited
- Power generation demand at peak period of year, requirements met

Operations During Normal Conditions

October through December

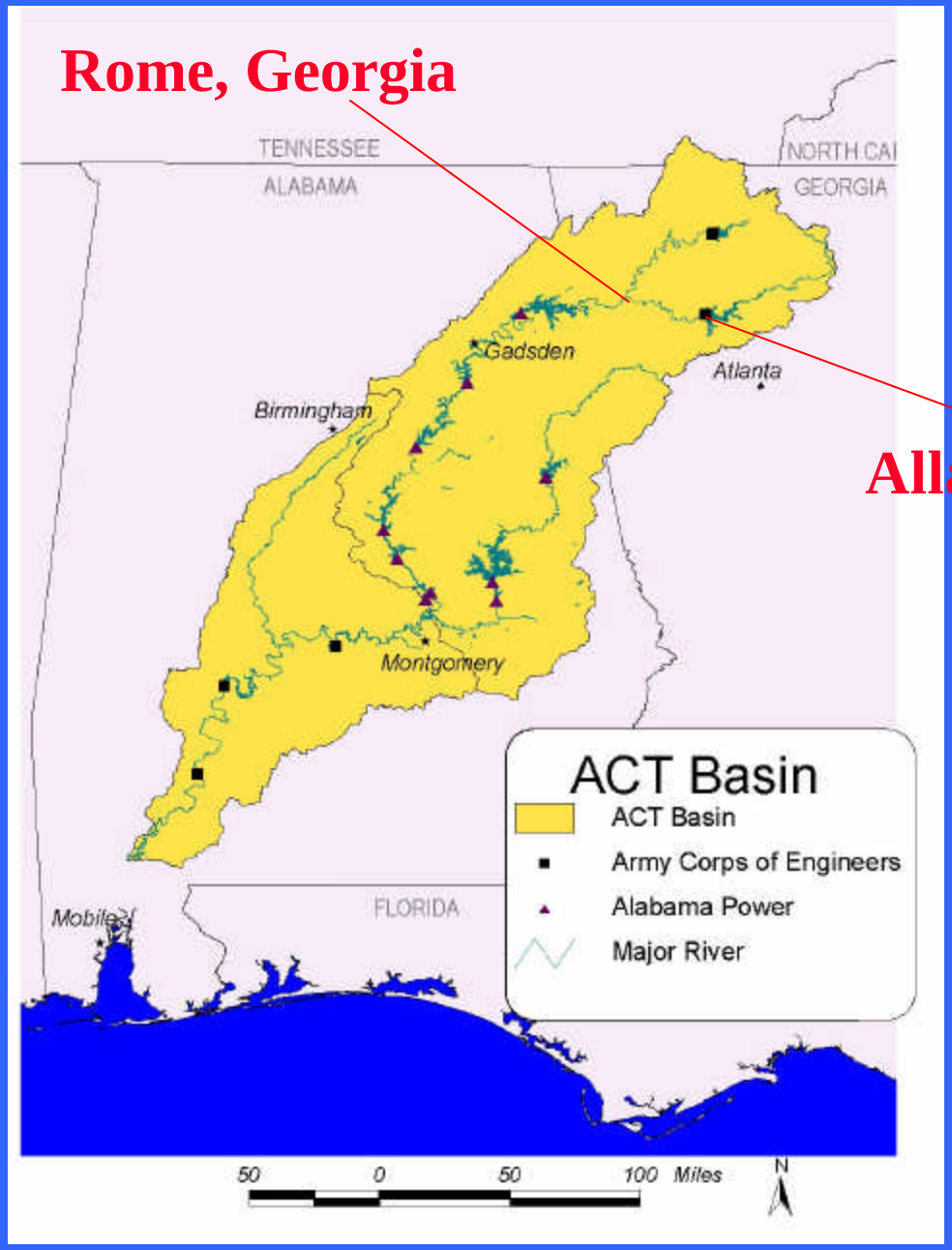
- Lakes begin drawdown for flood season
- Basin inflows at lowest levels
- Limited navigation
- Power generation requirements met
- Water quality and water supply targets closely monitored

Operations During Flood Conditions

- Weather forecasts and conditions monitored
- Project data received via computer & phone
- River gages monitored
- Data provided to River Forecast Center
- Releases and generation curtailed at projects when downstream gages indicate flooding
- Forecasts received from River Forecast Center
- Notification & flood reports provided to State and Federal emergency management offices
- Rivers crest and begin to recede

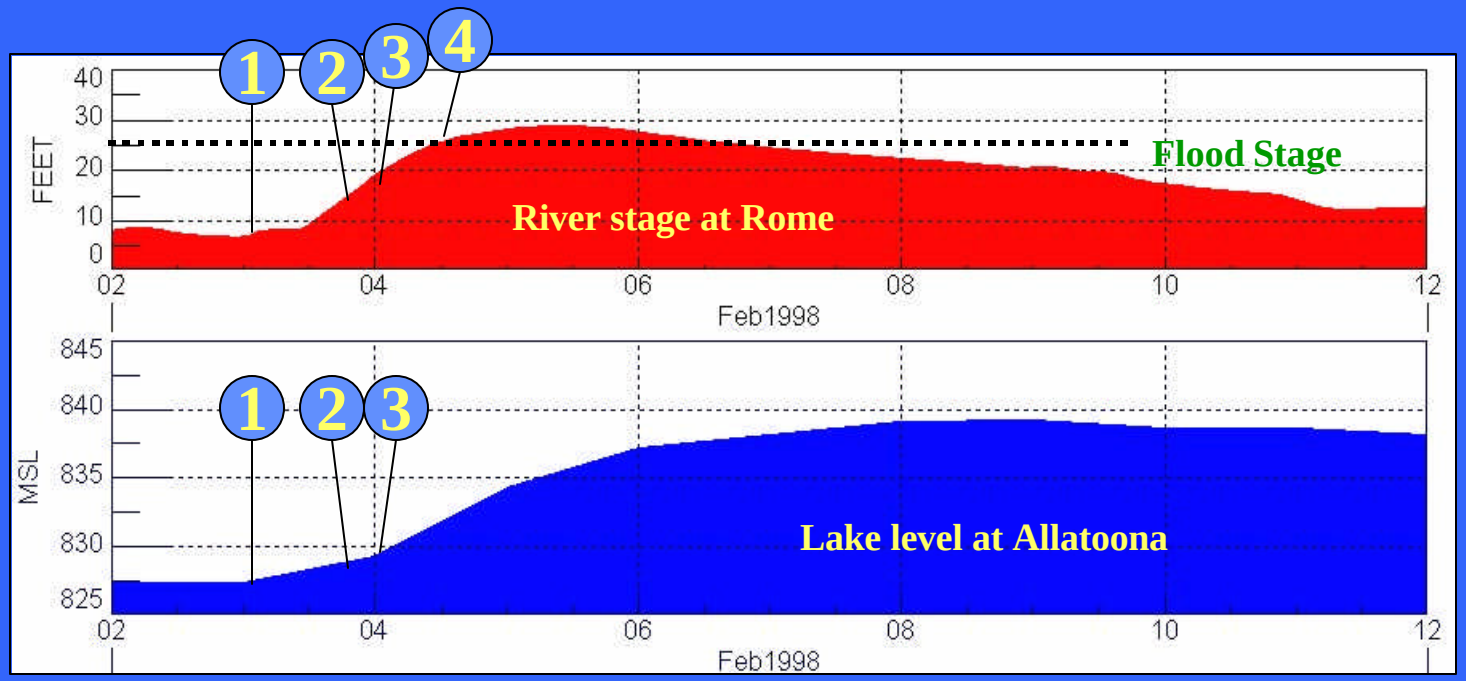
Operations During Flood Conditions
(continued)

- Releases resume once river drops below flood stage
- Dam stores excess water to reduce flooding downstream
- Flood waters evacuated from project at rate not exceeding bankfull capacity
- Operations return to normal
- Follow-up flood reports prepared


Rome, Georgia
Allatoona Dam
TENNESSEE
ALABAMA
NORTH CAI
GEORGIA
Gadsden
Atlanta
Birmingham
Montgomery
Mobile
FLORIDA
ACT Basin
ACT Basin
Army Corps of Engineers
Alabama Power
Major River
50
0
50
100 Miles
N

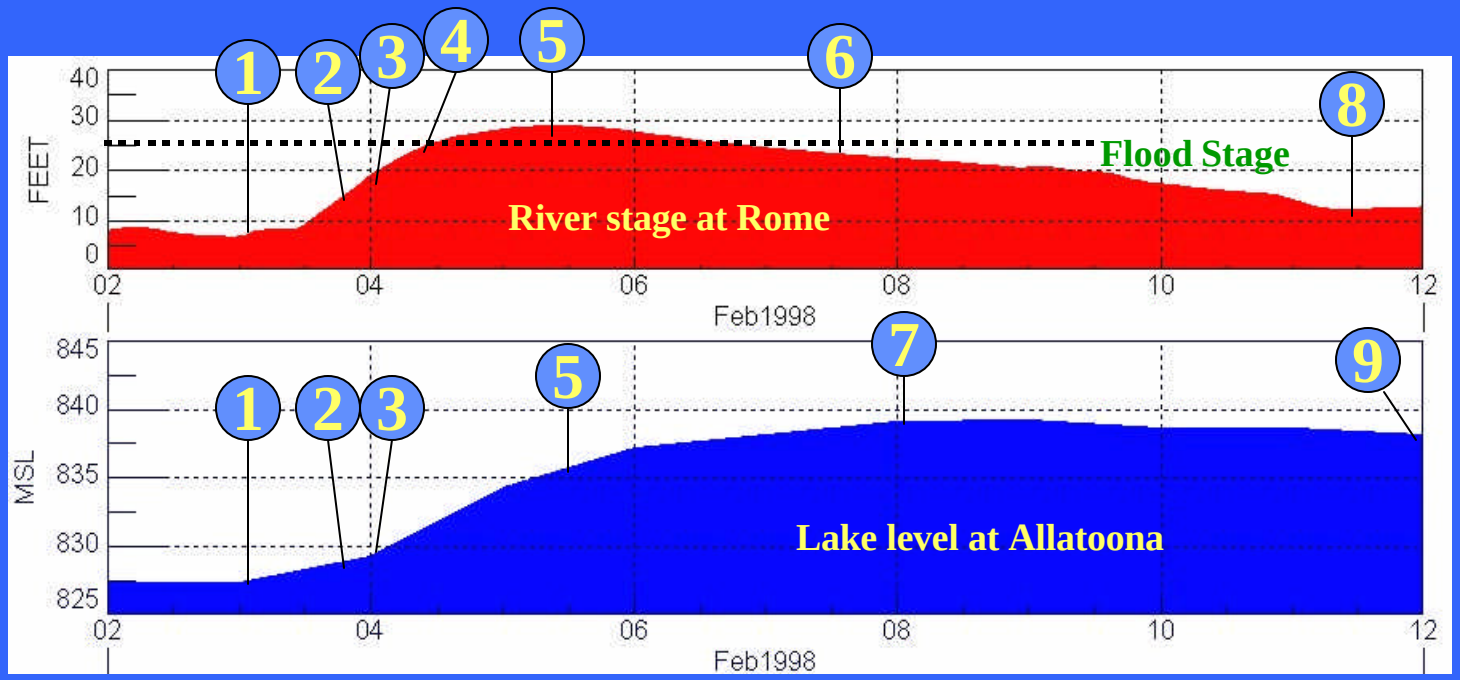
Example Flood Scenario

1. Rainfall forecasts from National Weather Service indicate 3”-4” expected in basin for 24 hour period ending on Feb 4.
2. Data received from project shows inflows increasing and gage at Rome indicates stage rising rapidly. River Forecast Center (RFC) predicts stage will reach flood stage.
3. SEPA notified to curtail generation at Allatoona until further notification. Stage at Rome nearing flood stage.
4. Stage at Rome reaches flood stage. Rainfall event ending.



Example Flood Scenario continued

5. Stage at Rome peaks. Rainfall event over. Lake continues to rise.
6. RFC provides updated forecast. Stage recedes below flood stage.
7. SEPA notified to resume generation at rate not to exceed bankfull capacity. Generates 24 hours per day.
8. Stage at Rome returns to normal range. Lake level continues to fall.
9. Lake continues to fall. Another rainfall event occurs on Feb 16.

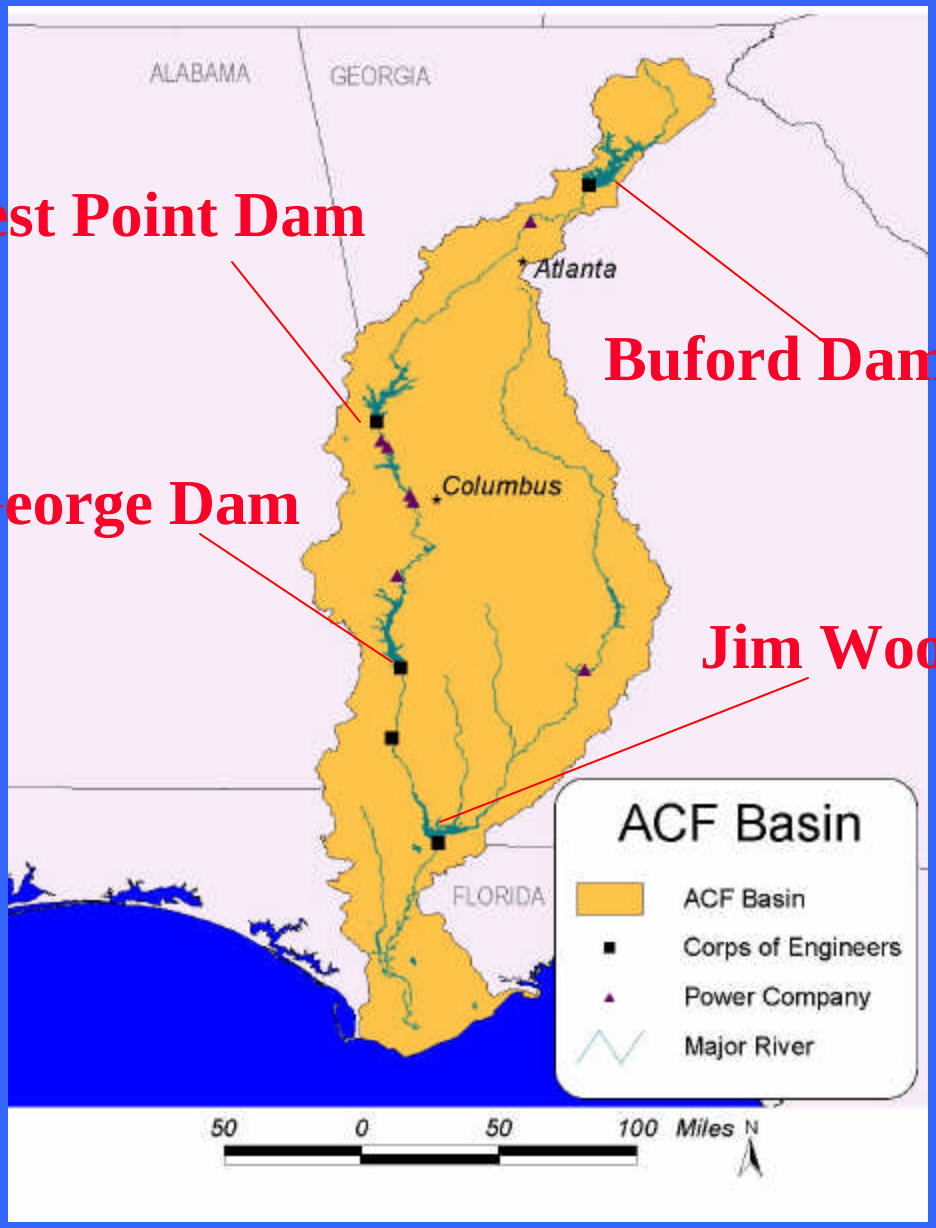


Operations During Drought Conditions

- Lake levels fall due to declining inflows in basin
- Rainfall forecasts indicate dry conditions ahead
- Discharges are reduced according to Water Control Plan
- Navigation reduced and curtailed as conditions worsen
- Lakes and basin inflows continue to decline
- Releases specifically for hydropower reduced
- State, Federal, local agencies, and stakeholders notified of drought
- Press releases issued to public periodically
- Coordination made with fishery agencies to facilitate fish spawn operations during low water periods

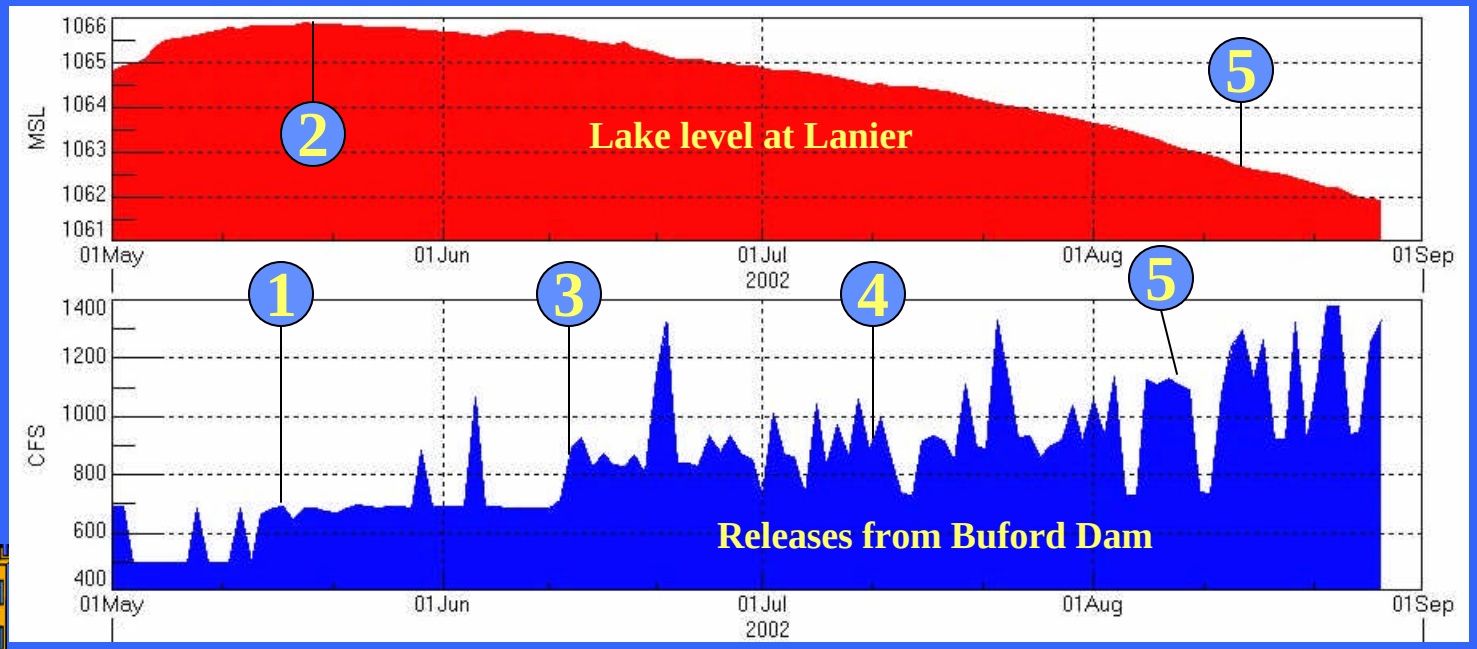
Operations During Drought Conditions
(continued)

- Releases from dams made to support water supply and water quality (WS/WQ)
- Releases for WS/WQ made through turbines providing limited hydropower
- SEPA may purchase replacement energy to fulfill contract
- Flow reduced from lower basin projects to meet minimum flow requirements
- Water to meet minimum flow draws from storage in upstream projects thus lowering lake levels

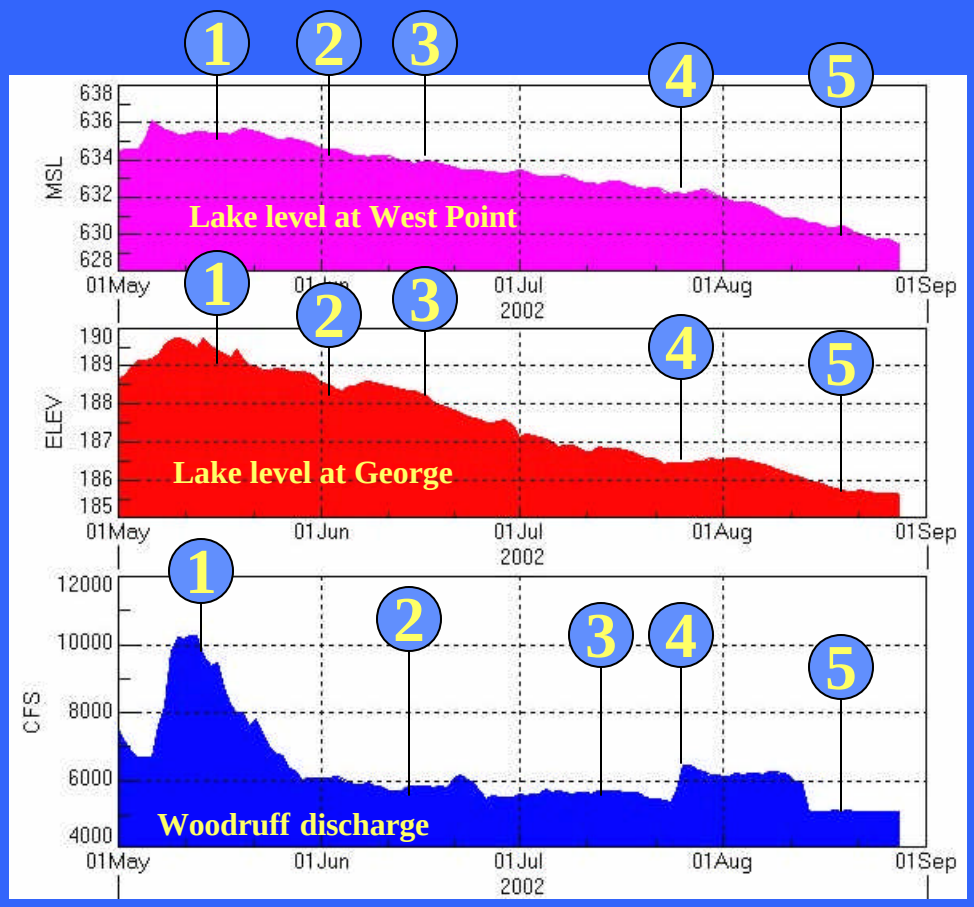

West Point Dam
Buford Dam
W.F. George Dam
Jim Woodruff Dam
ALABAMA
GEORGIA
FLORIDA
Atlanta
Columbus
ACF Basin
ACF Basin
Corps of Engineers
Power Company
Major River
50
0
50
100 Miles
N

Example Drought Scenario

1. Average inflow for ACF basin in May is 40% of normal. Releases from Buford Dam for water supply and water quality needs in Atlanta area averages 700 cfs in May. Releases are made thru turbine in most efficient and cost effective means.
2. Lanier reaches peak elevation of 1065.9 in May.
3. Average inflow in June is 25% of normal. Releases from Buford averages 830 cfs in June.
4. Average inflow in July is 29% of normal. Releases from Buford averages 930 cfs in July.
5. Average inflow in August is 21% of normal. Releases from Buford averages 1070 cfs. Increases are due to evaporation, increased summer withdrawals, and dry conditions in basin. Lanier's level continues to decline.



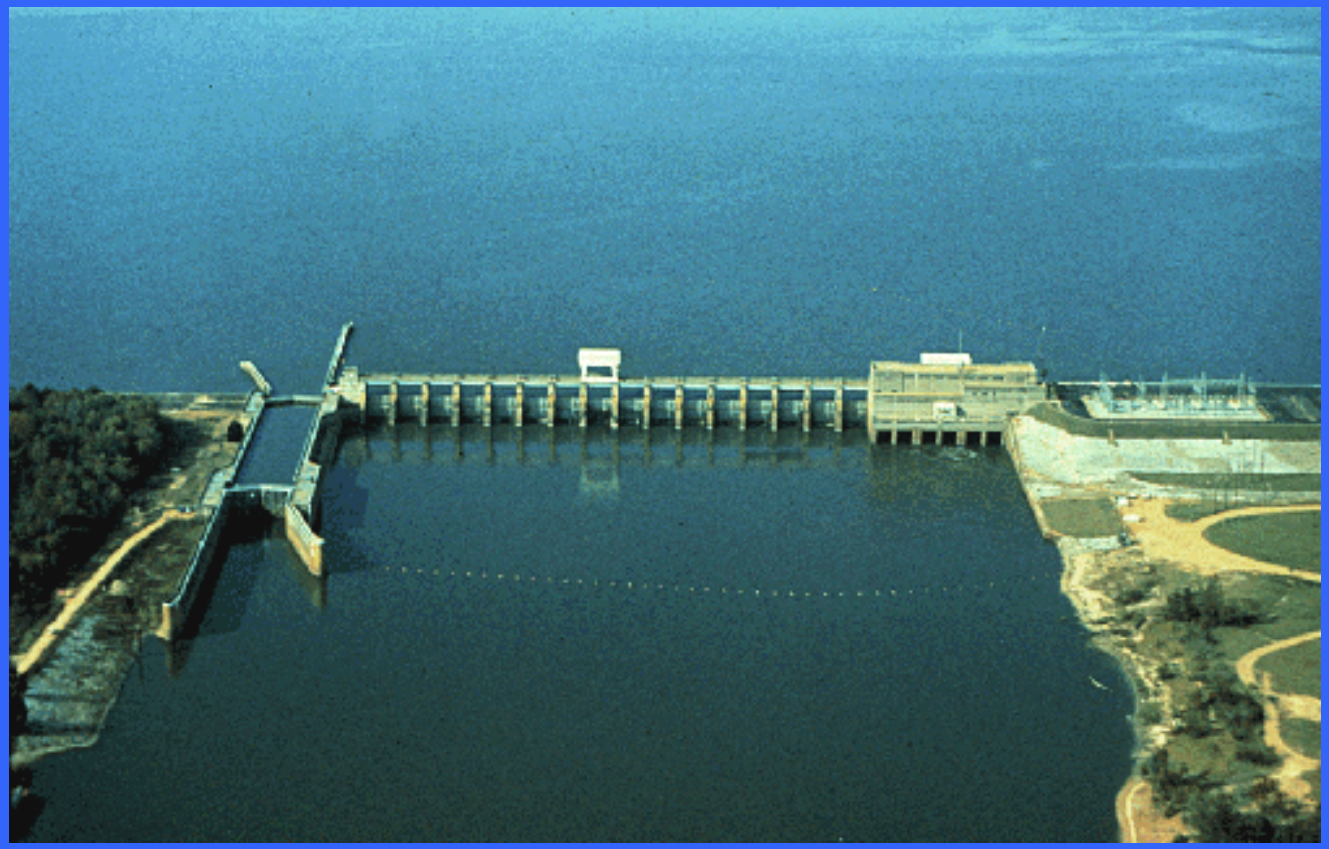
Example Drought Scenario continued



1. Rainfall event in early May causes rise in lakes. Head limits at George and Woodruff prompt increased releases.
2. In June, lakes at summer level. Releases from Woodruff reduced from 6100 cfs to 5500 cfs.
3. ACF basin inflow averages 4500 cfs (26% of normal) in July. Lakes continue to decline due to water drawn from storage to supplement Apalachicola flow.
4. Rainfall in basin above Woodruff and head limits require increase in discharge. Other lakes continue to decline at slower rate.
5. Conditions worsen in August and flow reduced to 5000 cfs from Woodruff. Lakes continue to decline. Basin average inflow is 2500 cfs. Half of 5000 cfs minimum must come from storage.

During summer months as conditions change, notification is made to impacted stakeholders and public via web page, newsletter, press releases and other means.

Water Control Manual and Plan Development



Water Control Manuals

- Documentation including water control plans for specific projects and reservoir systems
- Updated or revised as necessary
  - Changes made in project area or downstream of project
  - Improvements in technology
  - New legislation
  - New environmental requirements
  - Other relevant factors

Water Control Manuals

- Comply with existing Federal laws and regulations and established Corps of Engineers policies
- Conform with objectives and provisions of authorizing legislation and supporting reports

General Policies

- Consider applicable Federal law
  - Fish and Wildlife Coordination Act
  - Endangered Species Act
  - National Environmental Policy Act (NEPA)
  - Clean Water Act
  - Federal Water Project Recreation Act
  - Water Resources Development Act provisions
  - Other applicable Federal Statutes

General Policies (cont.)

- Efficient water management with water conservation as a National priority
  - Balanced resource use
  - Maximize all project functions

General Policies (cont.)

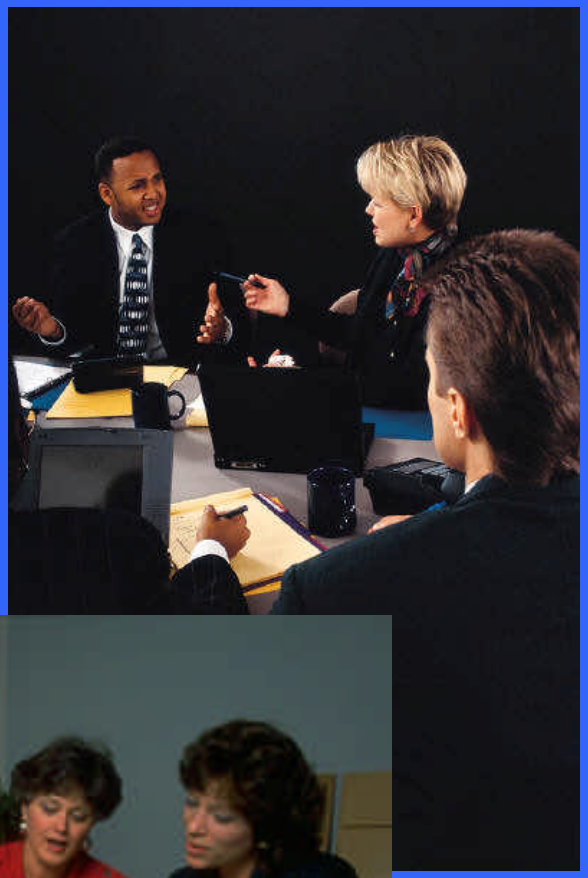
- Drought Contingency Plan to evaluate conditions requiring deviation from normal release schedules
- Monitor project operations
  - Advisories to higher authorities and other concerned parties
  - Keep the public fully informed

General Policies (cont.)

- Operate for safety of facilities and the general public
  - Issue adequate warnings
  - Alert all affected interests to possible hazards from project operations

General Policies (cont.)

- Develop water control plans in concert with all basin interests
  - –Federal, State, local agencies
  - –Other public interests and stakeholders



Responsibilities for Water Control Manuals and Plans

- Chief of Engineers prescribes policies and general guideline
- Division Engineer approves water control plans and manuals, and associated activities
- District Engineer conducts background studies and develops water control manuals and plans

Public Involvement

- Water Resources Development Act of 1988
  - Public review and comment required for changes resulting in reallocation of storage or effects on project purposes
- Public involvement and public meetings required:
  - Development of a new water control manual that includes a water control plan
  - Revision/update of a water control manual that changes the water control plan
  - Not required for administrative or informational changes
- Integrate with NEPA Process

Public Involvement (cont.)

- Information on proposed plan or changes to plan provided to the public 30 days prior to public meeting
  - Describes the recommended plan or changes to the plan
  - Provides technical basis for proposed change
  - Describes effects and impacts (monetary and non-monetary) on various project purposes
  - Analysis of alternatives and their effects (integrate with NEPA)
- Manual or Plan to be finalized only after public involvement and NEPA process completed

Review Process

- Independent technical review
- Public interest review by affected parties and other stakeholders
- Final Action by Division Engineer on Water Control Manual and Plan

Public Information

- Water Control Manuals available for public examination at the District Office
- Public notice in event of occurring or anticipated significant changes in reservoir storage or flow releases

Contents of a Water Control Manual

- I – Introduction
- II – Description of Project
- III – History of Project
- IV – Watershed Characteristics
- V – Data Collection and Communication Networks
- VI – Hydrologic Forecasts
- VII – Water Control Plan
- VIII – Effect of Water Control Plan
- IX – Water Control Management

Approach for Implementation of ACT and ACF Water Allocation Formulas

- ACT and ACF Compacts require implementation of the allocation formulas
  - to maximum extent practicable
  - consistent with existing Federal law

Approach for Implementation of ACT and ACF Water Allocation Formulas (cont.)

- Prepare revision to Water Control Manuals and Plans upon agreement on an allocation formula
  - Include measures under current Congressional authorization and within discretion of District Engineer
  - Partial implementation of the allocation formulas

Implementation of ACT and ACF Water Allocation Formulas (cont.)

- Revise and update the Water Control Manuals and Plans incrementally or in phases
  - As reallocation studies are completed
  - As additional Congressional authorizations are obtained
  - To accommodate phased implementation
  - To adapt to changing conditions