

## ADAPTIVE MANAGEMENT PLAN

Due to the number of unknown factors regarding the future characteristics of the Apalachee River watershed (Upper Oconee) and how these changes may influence the available flow and the long term composition of the existing biological community, an adaptive management approach has been incorporated into the proposed mitigation plan. By adaptive management the Authority means the adoption of permit conditions which will allow the project to proceed and the Authority to meet short term and intermediate water needs while providing for the possibility that additional information, available through review of monitoring data, could suggest adjustments in the operation of the facility which may be necessary to protect the Apalachee River and Hard Labor Creek. To meet these objectives the Authority will incorporate the specific monitoring requirements and permit conditions presented:

1. The applicant will submit a monitoring plan for approval by the USACE with consultation from USEPA, USFWS and GA EPD that includes at the minimum the following elements:
  - A. Continuous flow monitoring stations (gages) should be established within one-quarter (1/4) mile upstream and downstream of the withdrawal point on the Apalachee River and a gage established on Hard Labor Creek downstream of the dam.
    - i. Gaging on Hard Labor Creek should be initiated within six (6) months of USACE permit issuance.
    - ii. Gaging on the Apalachee River should be initiated a minimum of two (2) years prior to the diversion of water to the Hard Labor Creek reservoir.
  - B. Water quality monitoring stations established at the flow monitoring stations.
    - i. Weekly sampling should be done for those parameters which are likely to be affected by the flow modifications. The parameters monitored should include:
      1. dissolved oxygen,
      2. temperature,
      3. pH, and
      4. turbidity.
    - ii. Sampling on Hard Labor Creek should be initiated within six (6) months of USACE permit issuance.
    - iii. Sampling on the Apalachee River should be initiated a minimum of two (2) years prior to the diversion of water to the Hard Labor Creek reservoir.
  - C. Biological monitoring stations should be established upstream and downstream of the withdrawal point on the Apalachee River and downstream of the Hard Labor Creek dam.

- i. A minimum of three monitoring sites should be established for each station.
- ii. Biological monitoring should follow EPA's Rapid Bioassessment Protocols (RBP) EP A 841- B-99-002) or other appropriate State method and include monitoring of:
  - a. periphyton,
  - b. macroinvertebrates,
  - c. fish\*, and
  - d. habitat, including geomorphological monitoring (e.g., cross-sections, longitudinal profiles, particle size distribution, etc.).

\*Three (3) stations, upstream/downstream on the Apalachee and downstream of Hard Labor Creek Dam, should be established. Protocols for fish biomonitoring established by the GA Wildlife Resources Division should be utilized.

- iii. Sampling on Hard Labor Creek should be initiated within six (6) months of USACE permit issuance.
  - iv. Sampling on the Apalachee River should be initiated a minimum of two (2) years prior to the diversion of water to the Hard Labor Creek reservoir.
  - v. Sampling frequency should be quarterly for the first three (3) years, then bi-annually (August and October) thereafter.
- D. Reporting of these data shall be on an annual basis to the GA EPD, USACE, and USEPA and USFWS with an analysis of the data provided at a minimum of five (5) year increments from initiation of data collection.
- E. The applicant shall provide an analysis of all the data as they relate to yield, flow, and biological integrity when one of the following thresholds are reached:
- i. Ten year increments from the initial withdrawal,
  - ii. Five years after each incremental annual yield increases of at least 25 % of the remaining sate yield (Hard Labor Creek reservoir excluded),
  - iii. A decrease of >20% of three or more RBP metrics, measured between the upstream/downstream stations or between downstream station results compared to the initial three years of monitoring.
2. Based upon the proposed minimum instream flows conditions (25%/18%/10%) (MAF), it appears that water quality standards and designated uses of both the Apalachee River and Hard Labor Creek will be met. This condition (proposed triggers) can be modified if:

- A. Site specific studies show different flows values will protect the Apalachee River's existing uses and this is concurred with by the USACE, USEPA, USFWS, and GA EPD or
- B. Biological monitoring shows an adverse impact related to the project's withdrawal ("adverse impact", see 1.E.3) and monitoring shows different flows values will protect the existing uses and this is concurred with by the USACE, USEPA, USFWS, and GA EPD

The details of the proposed monitoring program may be summarized as follows:

- (a) Hard Labor Creek Monitoring: The Authority agrees to begin monitoring Hard Labor Creek within 6 months of permit authorization. Continuous monitoring devices (or instruments which gather similar data) will be installed to monitor discharge and measure pH, temperature, conductivity, DO, and turbidity. These parameters will be measured on a weekly basis and during high flow events. Others nutrient and cation levels will be measured in the field a minimum of four times per year for the first three years and then twice per year after that. Periphyton and geomorphology initially will be measured four times per year for the first three years and then twice per year in year four and beyond. Fishes and aquatic macroinvertebrates will be sampled twice per year beginning prior to construction and continuing thereafter. Each of these biological monitoring stations will be installed at three sites and will follow EPA's Rapid Bioassessment Protocols.
- (b) Apalachee River Monitoring: A minimum of two (2) years prior to beginning the diversion of water to the reservoir for storage, a similar monitoring protocol will be initiated on the Apalachee River. In addition, to detect any changes occurring in the River which are unrelated to the project, a control station will also be established upstream of the proposed intake location at High Shoals. Data gathered at the downstream locations will be compared to data generated by upstream monitoring in order to detect changes in the River which may be attributable to the project.
- (c) Miscellaneous Monitoring Conditions: Every tenth year the Authority will analyze the data and assess the impacts of the project on both Hard Labor Creek and the Apalachee River. After consultation with and concurrence by the GA EPD, US FWS and US EPA, the USACE may require the Authority to implement any practicable modifications of the pumping regime from the Apalachee River in an effort to reduce any measured impacts upon aquatic systems.