STUDY REPORT

CHOCCOLOCCO CREEK WATERSHED

FISH TISSUE AND SEDIMENT ANALYSES

JANUARY 1994

SPECIAL STUDIES SECTION
FIELD OPERATIONS DIVISION
ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

REPORT

CHOCCOLOCCO CREEK WATERSHED STUDY
FISH TISSUE AND SEDIMENT ANALYSES

INTRODUCTION

During the Summer of 1993, the Special Studies Section of the Field Operations Division was contacted by a contractor performing snagging operations on Choccolocco Creek near Anniston, AL. The contractor had become concerned about the possible presence of pollutants in fish from the creek after several deformed largemouth bass were caught. A request was made for the Department to sample fish from Choccolocco Creek and the monitoring was scheduled for Fall, 1993 as part of the ADEM Fish Tissue Monitoring Program. Following the initial contact, the contractor notified the Division that because of his concerns he had decided to collect largemouth bass and have them analyzed by an independent laboratory prior to the scheduled ADEM sampling. Results forwarded to the Division revealed a concentration of total PCBs in fish tissue of approximately 23 ppm, well above the FDA action level of 2.0 ppm.

Study Purpose

Fish Tissue Collection and Analysis

The Field Operations Division conducted fish tissue sampling in Choccolocco Creek in late August rather than in October, as originally scheduled, after receiving the general fish collection locations and the results of the independent laboratory analysis from the contractor.

Sediment Collection and Analysis

In conjunction with the August fish collection, sediment samples were collected from four locations on Choccolocco Creek to determine if the PCB contamination found in the fish could be linked to PCBs in the sediment.

After analysis of the sediment and fish tissue samples collected in August, a more intensive sediment sampling study of Choccolocco Creek, several of its' major tributaries, and selected smaller tributaries (Table 1), was conducted to allow delineation of the source or sources of pollutants to the Choccolocco Creek watershed. Proposed sampling sites were chosen following discussions with designated representatives of the Department's Water and Land Divisions and Special Projects and also following review of all available studies conducted in the watershed in the past. This portion of the study was to serve primarily as an initial screening survey that would provide information useful in the planning of any future intensive sampling thought necessary.

MATERIALS AND METHODS

Study Area

The Choccolocco Creek watershed is located in the Coosa River Basin and occupies parts of Talladega, Calhoun and Cleburne Counties in eastern Alabama. Fish were collected on August 26 - 27, 1993 from two reaches on Choccolocco Creek (Figure 1). The upstream reach (CHOC1) included the section of Choccolocco Creek immediately downstream of the confluence with Dry Branch to approximately ½ mile downstream of the Southern Railways bridge crossing (Figure 2). The downstream reach (CHOC2) was located from approximately ¼ mile upstream to approximately ¾ mile downstream of the Talladega County Road 399 bridge crossing.

The survey of bottom sediments in the Choccolocco Creek watershed for the presence of detectable PCBs and mercury focused on ten tributary streams (Figure 1): Hillabee Creek, Dry Branch, Silver Run Creek, Salt Creek, Coldwater Creek, Snow Creek, and three unnamed tributaries (UT) as well as Choccolocco Creek. Jackson Creek in Cleburne County was utilized as a background station.

The station locations listed below and noted on the map (Figure 1) were utilized to collect sediment samples for PCBs and mercury analysis (Station numbers 1 through 20 and DUP 1 and 2 were collected on November 9 - 10, 1993 and analyzed for PCBs and mercury. Station numbers 21 through 24 were collected on August 24 and 26, 1993 and analyzed for PCBs only):

STATION NO.	LOCATION DESCRIPTION
1	Choccolocco Creek at unnumbered Calhoun County road crossing upstream of confluence with Egoniaga Creek Sampling reach was from approx. 10 meters upstream of bridge to approx. 10 meters downstream of single lane bridge. Confluence with Egoniaga is approx. 30 meters below bridge. T16S/R9E/S9/SE¼ (Topographic map #170NW)
2	Jackson Creek at Hwy 431 road crossing in Cleburne County. Sampling reach was approx. 15 meters downstream of bridge (culvert) to approx. 2 meters upstream of bridge (culvert) T16S/R9E/S29/SW¼ (Topographic map #170SW)
3	Choccolocco Creek at McIntosh Road crossing in Calhoun County. Sampling reach was approx. 90 meters upstream to approx. 115 meters upstream of bridge. T16S/R8E/S36/NW¼ (Topographic map #171SE)

Study Area, cont.

STATION NO.	LOCATION DESCRIPTION
4A	Hillabee Creek at water treatment plant on unnamed unimproved road off of McIntosh Road in Calhoun County. Sampling reach was from power pole to approx. 20 meters upstream (large weed bed with trees in it). T16S/R8E/S36/SW¼/SW¼ (Topographic map #171SE)
5A	Dry Branch approx. ½ mile downstream of Talladega County 128 road crossing. Sampling reach was from the start of woods on right bank (approx. ½ mile downstream) to approx. 90 meters further upstream. T17S/R7E/S12/NW¼ (Topographic map #171SE)
8	Coldwater Creek at unnumbered Calhoun County road and Old Covered Bridge Road upstream of confluence with Choccolocco Creek. Sampling reach was from just upstream of bridge to approx. 30 meters upstream of bridge. T16S/R7E/S33/SW¼ (Topographic map #171SW)
9	Coldwater Creek (upstream of Station 8) at unnumbered Calhoun County road crossing (Cecile Road) in front of the Coldwater United Methodist Church. Sampling reach was from bridge to approx. 30 meters upstream of the bridge. T16S/R7E/S29/SW¼ (Topographic map #171SW)
10	Coldwater Creek (upstream of Station 9) at AL Hwy 202 road crossing next to Gauldin's Sports Center. Sampling reach was from upstream of bridge to just above a small beaver dam approx. 25 meters upstream of bridge. T16S/R7E/S20/SW¼ (Topographic map #171SW)
12	Snow Creek at unnumbered Calhoun County road crossing (road just north of the mall) upstream of confluence with Choccolocco Creek. Sampling reach was from upstream side of culvert to approx. 30 meters upstream of culvert. T16S/R8E/S20/SW¼ (Topographic map #171SE)
13	Snow Creek at the 4th Street bridge crossing by the AmTrak station (creek contained in concrete channel). Sampling reach was from approx. 20 meters upstream of the 4th Street bridge to just downstream of a small ditch entering from the NE further upstream of the bridge. Calhoun County T16S/R8E/S7/SE¼/NE¼ (Topographic map #171NE)

Study Area, cont.

STATION NO.	LOCATION DESCRIPTION
14	Snow Creek at the 15th Street bridge between Boynton and Crawford Streets. Sampling reach was the stream channel between the 15th and 16th Street bridges. Calhoun County T16S/R7E/S7/SE¼/NE¼ (Topographic map #171NE)
15	Snow Creek at the bridge crossing of the junction of 14th Street and Crawford Street. Sampling reach was the stream channel between 14th and 15th Street bridges. Calhoun County T16S/R7E/S1/SE¼/NE¼ (Topographic map #171NE)
16A	Unnamed Tributary to Choccolocco Creek at a sewer line trail at the west end of Joe Street. Sampling reach was from approx. 30 meters to 50 meters downstream of the end of the trail. Calhoun County T16S/R8E/S28/NW¼/SW¼ (Topographic map #171SE)
17A	Unnamed Tributary to Choccolocco Creek at the south side of I-20 in Calhoun County. (Accessed by I-20 exit 188 and taking the first left) Sampling reach was from the I-20 culvert to approx. 25 meters downstream of the culvert. T16S/R8E/S27/NW¼/SE¼ (Topographic map #171SE)
18	Unnamed Tributary to Choccolocco Creek at a quarry road in Calhoun County. Sampling reach was from the bridge on a gravel mining road to approx. 40 meters upstream of the bridge. T16S/R8E/S27/SE¼ (Topographic map #171SE)
19	Choccolocco Creek just downstream of the confluence with Snow Creek at unnamed paved road in Calhoun County. Sampling reach was from bridge to approx. 5 meters downstream of bridge. T16S/R8E/S29/SW¼ (Topographic map #171SE)
20	Snow Creek at the bridge crossing near the railroad tracks at the junction of Mulberry and 9th Streets in Calhoun County. Sampling reach was from the bridge to approx. 20 meters downstream of the 9th Street bridge. T16S/R8E/S7/NE¼/NW¼ (Topographic map #171NE)
DUP 1	(Taken at station number 8)
DUP 2	(Taken at station number 1)

Study Area, cont.

STATION NO.	LOCATION DESCRIPTION
21	Choccolocco Creek immediately upstream of the confluence with Dry Branch. T17S/R7E/S2/SE¼/NE¼/SE¼ (Topographic map #171SE) (Previously named "@ First Sediment Trap")
22	Choccolocco Creek immediately upstream of Southern Railways crossing. T17S/R7E/S3/SE¼/SE¼/NE¼ (Topographic map #171SW) (Previously named "@ Railroad Crossing")
23	Choccolocco Creek immediately downstream of power line crossing. T17S/R7E/S4/NW¼/SW¼/SW¼ (Topographic map #171SW) (Previously named "@ Power Line Crossing")
24	Choccolocco Creek immediately downstream of ambient monitoring station CL-3. T17S/R6E/S15/NW¼/SW¼/SW¼ (Topographic map #172SE) (Previously named "@ CL-3")

Sampling Methodology

Fish Tissue Collection

Both bottom feeders (channel catfish) and predatory species (largemouth and spotted bass) were collected from two stream segments on Choccolocco Creek located between AL Highway 21 and Talladega County Road 5 utilizing both boat mounted electrofishing equipment and gill nets as outlined in the Field Operations Standard Operating Procedures for Fish Sampling and Tissue Preparation for Bioaccumulative Contaminants. Individual analysis of skin-off fillets from each fish was conducted for the ten parameters regularly included in the Fish Tissue Monitoring Program (Table 2).

Sediment Collection

Bottom sediment samples were collected using the appropriate "Sediment Sampling" methodology as outlined in the Field Operations Standard Operating Procedures Manual Volume I - Physical/Chemical Section.

Sediment Collection, cont.

At each station, sediment samples were collected utilizing an Ekman dredge (non-wadeable or higher flow areas) or a stainless steel scoop (shallow non-flowing areas). Portions of the sample were collected from three areas (or more, if required to obtain enough sample), drained of excess water and composited in a stainless steel pan. The composited sample was thoroughly mixed with a stainless steel scoop. A pre-cleaned pint glass jar was then filled to capacity utilizing the scoop. A piece of aluminum foil (dull side to the sample) was placed over the jar opening followed by the jar lid and the ring. The sample jar was labeled as to the station location, date, time, collectors and stored in a cooler of ice.

During the field survey, following sampling at each station, all stainless steel equipment was cleaned as follows:

1. Cleaned with tap water (and brush if necessary).
2. Rinsed with pesticide grade isopropanol.
3. Rinsed thoroughly with tap water.
4. Rinsed with distilled water.

Sediment and Fish Tissue Analysis Parameters

The following are the parameters utilized for analysis along with the laboratory detection limits, reporting units and analysis methodology:

	METHOD	DETECTION LIMITS	UNITS
Mercury (Sediment)	EPA 245.1	0.1	ug/g
Total PCBs (Sediment)	EPA 8081	0.05	ug/g
Mercury (Fish)	EPA 245.2	0.1	ug/g
Total PCBs (Fish)	OB 10/90*	0.05	ug/g

* From Extraction and Analysis of Organics and Biological Tissue. Analytical Support Branch EPA Region IV, Athens Georgia.

Chain of Custody

Sample handling and chain-of-custody for all samples collected were as per the appropriate section in the Field Operations Standard Operating Procedures Manual Volume I or the ADEM Standard Operating Procedures for Fish Sampling and Tissue Preparation for Bioaccumulative Contaminants. ADEM form 68 or 236 (sediment) and the "ADEM Biological Sample Collection Record (Fish)" were utilized as chain-of custody for the samples.

Quality Assurance/Quality Control

Duplicate sediment samples (repeat sampling at a station) were collected at a minimum of 10 percent of the stations sampled.

RESULTS

Tissue from 18 of the 19 fish collected exceeded the FDA action limit for total PCBs (Table 2) with concentrations ranging from 2.1 to 38.4 ppm. Four fish exceeded the FDA action limit of 1.0 ppm for Mercury. Fourteen additional fish were found to have detectable concentrations of Mercury ranging from 0.25 to 0.91 ppm.

The fish tissue data were forwarded to the Alabama Department of Public Health and a "no consumption" advisory was subsequently issued for all species of fish caught between the confluence of Snow Creek and Choccolocco Creek south of Oxford, downstream to the confluence of Choccolocco Creek with Logan Martin Reservoir (Coosa River).

Laboratory analysis of the sediments indicated that 14 of the 21 samples collected had detectable levels of PCBs (Table 3) with concentrations ranging from 0.06 to 38.57 ppm. With two exceptions (Sta 8, 1), all samples that had total PCB concentrations well above laboratory detection limits were found in Snow Creek and its' tributaries or in Choccolocco Creek below the confluence with Snow Creek. One of the 17 samples analyzed for Mercury had levels above the 0.50 ppm detection limit with a value of 0.91 ppm (Sta.19).

TABLE 1

POSSIBLE POLLUTANT SOURCES WITHIN THE WATERSHED

STATION NUMBER	POSSIBLE POLLUTANT SOURCES
1	unknown sources upstream of survey reach
2	unknown sources - Large Tributary
3	Story's Scrap Yard Plater near Choccolocco Creek Hwy 78 crossing
4A	unknown sources - Large Tributary
5A	Skyway Scrap Yard
8-10	Gold Bond Gypsum Plant Anniston Army Depot
12-15,19-20	Tull Chemicals U.S. Pipe An Old Foundry near U.S. Pipe Shorty's Scrap Yard Defense Research Two Large Scrap Yards near U.S. Pipe Union Foundry M & H Valve Monsanto West End Landfill (Alabama Power Substation) Huron Valley Steel Cooper Scrap Yard
16A	Magic Chef
17A	Lee Brass
18	Triangle Refineries Triangle Gas Terminal Aluminum Plant (near Triangle)

TABLE 2

CHOCCOLOCCO CREEK WATERSHED STUDY
FISH TISSUE ANALYSIS*

STATION NUMBER	COLLECTION DATE MM/DD/YY	FISH TYPE	AROCLOR 1248 PPM	AROCLOR 1254 PPM	AROCLOR 1260 PPM	TOTAL PCB PPM	MERCURY PPM
CHOC1	8/27/93	LMB	0.44	0.72	0.94	2.10	0.44
CHOC1	8/27/93	SPOTTED BASS	1.65	3.00	3.90	8.55	0.58
CHOC1	8/27/93	SPOTTED BASS	0.29	0.60	0.90	1.79	1.41
CHOC1	8/27/93	SPOTTED BASS	7.80	13.90	16.70	38.40	0.80
CHOC1	8/27/93	SPOTTED BASS	0.50	0.90	0.92	2.32	0.74
CHOC1	8/27/93	C.CATFISH	1.90	3.30	2.90	8.10	0.25
CHOC1	8/27/93	W.CRAPPIE	0.31	0.82	1.10	2.23	1.07
CHOC2	8/26/93	LMB	4.00	6.60	6.90	17.50	0.91
CHOC2	8/26/93	LMB	1.97	3.54	4.10	9.61	1.17
CHOC2	8/26/93	LMB	6.60	8.60	8.60	23.80	0.67
CHOC2	8/26/93	LMB	3.30	4.90	5.44	13.64	<0.10
CHOC2	8/26/93	LMB	6.40	8.70	10.10	25.20	0.82
CHOC2	8/26/93	LMB	3.10	4.96	5.80	13.86	1.17
CHOC2	8/26/93	SPOTTED BASS	3.00	4.00	4.60	11.60	1.13
CHOC2	8/26/93	C.CATFISH	4.60	5.90	6.20	16.70	0.44
CHOC2	8/26/93	C.CATFISH	10.40	11.40	11.70	33.50	0.42
CHOC2	8/26/93	C.CATFISH	12.10	13.80	11.20	37.10	0.49
CHOC2	8/26/93	C.CATFISH	8.40	12.30	11.00	31.70	0.57
CHOC2	8/26/93	C.CATFISH	7.96	10.80	11.90	30.66	0.57

* ANALYSES FOR CHLORDANE, DDD, DDE, DDT, DIELDRIN, DURSBAN, ENDRIN, HEPTACHLOR, HEPTACHLOR-EPOXIDE, MIREX, AND TOXAPHENE WERE ALL LESS THAN DETECTION LIMITS

TABLE 3

CHOCCOLOCCO CREEK WATERSHED STUDY
SEDIMENT PCB ANALYSIS *

STATION NUMBER	DATE MM/DD/YY	TIME HRS	AROCHLOR 1242 PPM	AROCHLOR 1254 PPM	AROCHLOR 1260 PPM	TOTAL PCB PPM	MERCURY PPM
1	11/9/93	1035	<0.05	<0.05	**0.241**	**0.241**	<0.50
2	11/9/93	1140	<0.05	<0.05	<0.05	<0.05	<0.50
3	11/9/93	1315	<0.05	<0.05	<0.05	<0.05	<0.50
4A	11/9/93	1435	<0.05	<0.05	<0.05	<0.05	<0.50
5A	11/10/93	840	<0.05	<0.05	**0.067**	**0.067**	<0.50
8	11/9/93	1014	<0.05	**0.13**	**0.05**	**0.18**	<0.50
9	11/9/93	1130	<0.05	<0.05	<0.05	<0.05	<0.50
10	11/9/93	1215	<0.05	<0.05	<0.05	<0.05	<0.50
12	11/10/93	930	**0.914**	**2.01**	**1.00**	**3.924**	<0.50
13	11/10/93	820	**3.87**	**7.63**	**4.47**	**15.97**	<0.50
14	11/10/93	930	**0.72**	**0.065**	**0.09**	**0.875**	<0.50
15	11/10/93	900	**1.26**	**1.51**	**0.59**	**3.36**	<0.50
16A	11/9/93	1345	<0.05	<0.05	<0.05	<0.05	<0.50
17A	11/9/93	1420	<0.05	**0.06**	<0.05	**0.06**	<0.50
18	11/9/93	1450	<0.05	<0.05	<0.05	<0.05	<0.50
19	11/9/93	1530	**1.23**	**1.64**	**1.46**	**4.33**	**0.91**
20	11/10/93	945	**15.52**	**11.21**	**11.84**	**38.57**	<0.50
DUP 1	11/9/93	1045	<0.05	**0.05**	**0.05**	**0.10**	<0.50
DUP 2	11/9/93	1100	<0.05	<0.05	**0.069**	**0.069**	<0.50
21	8/26/93	1300	**2.12**	<0.05	**2.00**	**4.12**	
22	8/24/93	1400	<0.05	<0.05	**0.15**	**0.15**	
23	8/24/93	1445	**0.363**	<0.05	**0.321**	**0.684**	
24	8/24/93	1545	<0.05	<0.05	**0.09**	**0.09**	

* ANALYSIS FOR AROCHLOR 1016, 1221, 1232 , 1248 WAS < 0.05

DUP 1 SAMPLES COLLECTED AT STATION 8 DUP 2 SAMPLE COLLECTED AT STATION 1

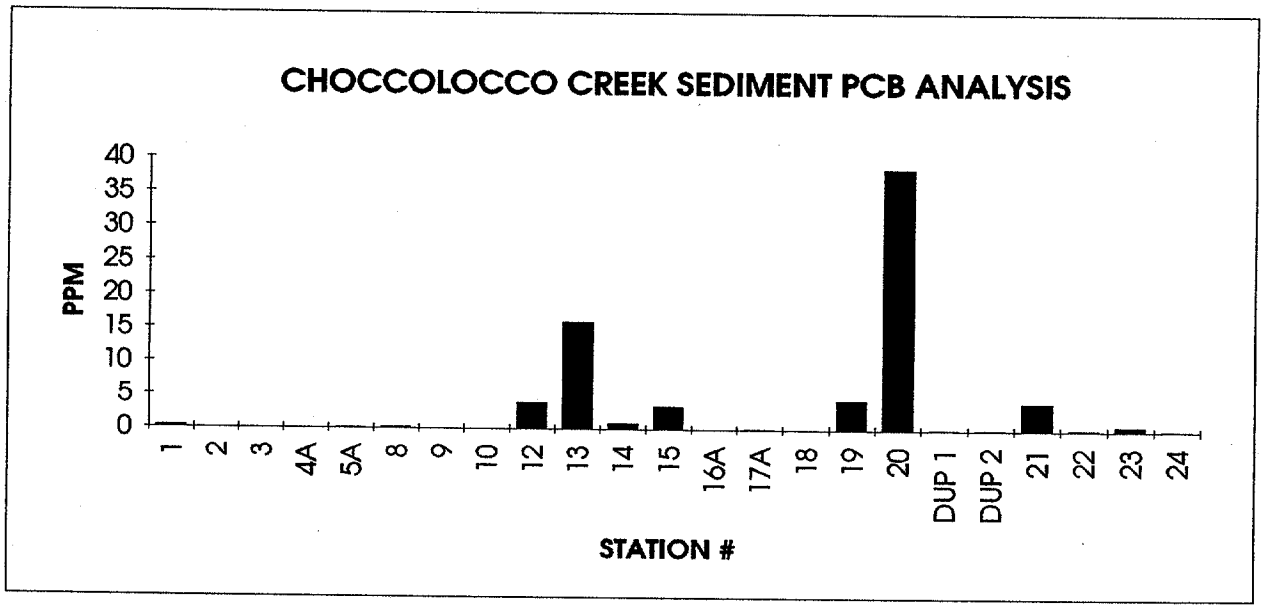
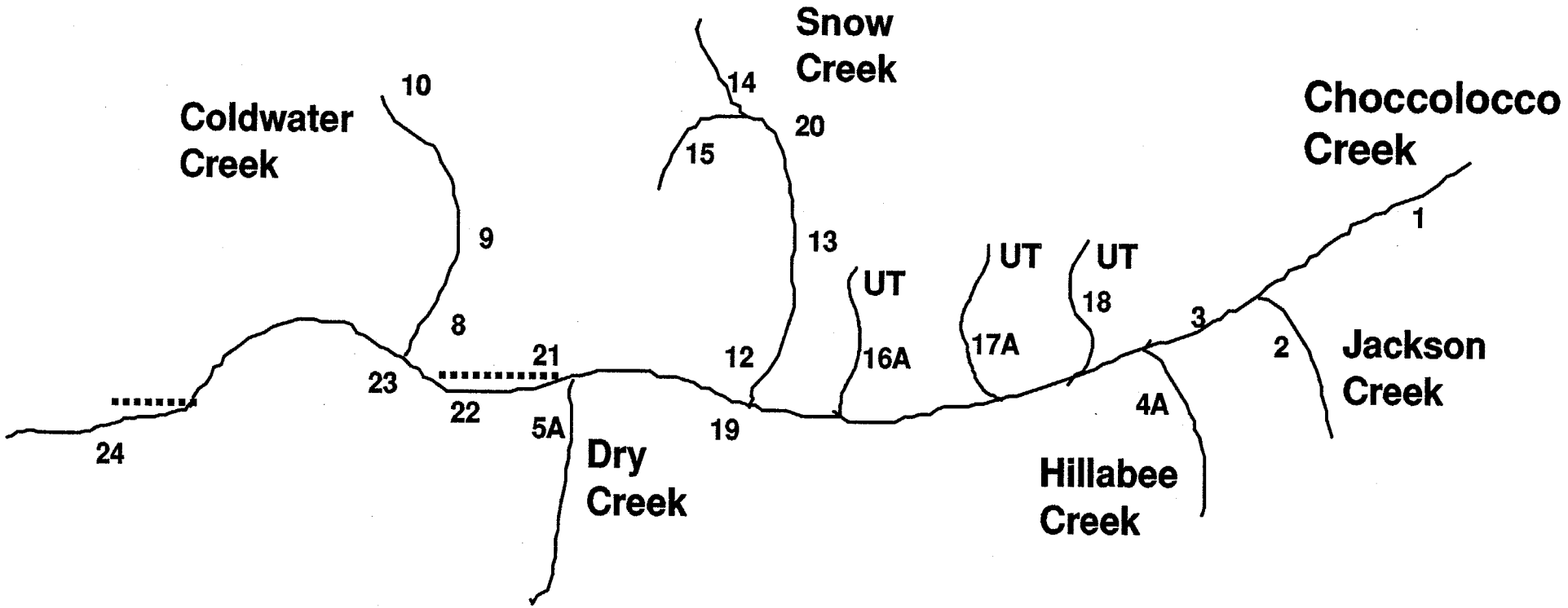


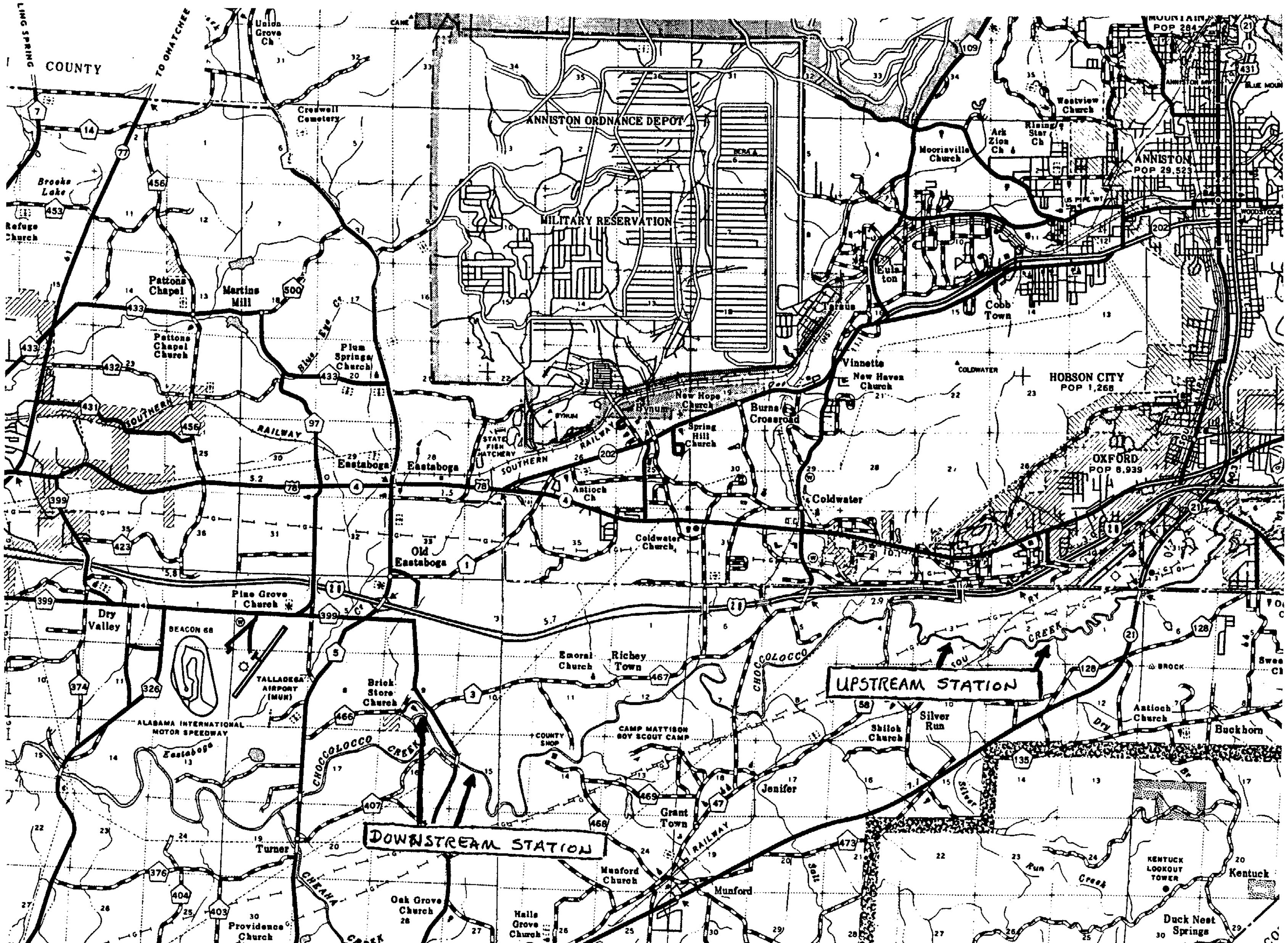
FIGURE 1



CHOCCOLOCCO CREEK WATERSHED

FISH COLLECTION STATIONS .....

FIGURE 2



ANNISTON ORDNANCE DEPOT
MILITARY RESERVATION
ANNISTON
POP 29,523
HOBSON CITY
POP 1,268
OXFORD
POP 8,939
COUNTY
TO OHATCHEE
Brooke Lake
Refuge Church
Pattons Chapel
Martins Mill
Pattons Chapel Church
Plum Springs Church
Creswell Cemetery
Union Grove Ch
Mooresville Church
Ark Zion Ch
Rising Star Ch
Westview Church
Eulaton
Cobb Town
Vinnetta
New Haven Church
New Hope Church
Burns Crossroad
Spring Hill Church
Antioch Ch
Coldwater
Coldwater Church
Eastaboga
Old Eastaboga
STATE FISH HATCHERY
SOUTHERN RAILWAY
Pine Grove Church
Dry Valley
BEACON 68
TALLADEGA AIRPORT (MUN)
ALABAMA INTERNATIONAL MOTOR SPEEDWAY
Brick Store Church
Emoral Church
Richey Town
CHOCCOLOCCO CREEK
UPSTREAM STATION
DOWNSTREAM STATION
COUNTY SHOP
CAMP MATTISON BOY SCOUT CAMP
Shiloh Church
Silver Run
Antioch Church
Buckhorn
Grant Town
Jenifer
Munford Church
Munford
Turner
Oak Grove Church
Halls Grove Church
Providence Church
CHEAHA CREEK
KENTUCK LOOKOUT TOWER
Kentuck
Duck Nest Springs

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