AN ENVIRONMENTAL REPORT ON THE BLACKWATER RIVER DRAINAGE BASIN IN SOUTHERN ALABAMA AND NORTHWESTERN FLORIDA.

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PRELIMINARY REPORT

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An environmental report on the Blackwater River Drainage Basin in Southern Alabama and Northwestern Florida: SUMMARY.

A brief history of the Blackwater River and forest management practices which have preserved the river in its natural state are given.

The biology of the river is discussed:

— its productive sand habitats, a unique ecosystem, and

— its extremely high diversity of aquatic animals.

We give a brief list of plants, mammals and fishes which are endangered or threatened, and which would become more severely endangered is large amounts of the natural habitat were lost.

A temporary list of endangered invertebrates is presented, but since the invertebrate list for Florida is unpublished at this time, only mayflies can be discussed in any detail.

Other considerations are mentioned:

— that one of the threatened species of mayflies represents a family of insects nearly extinct in the world.

— that of only two fully protected rivers in the Southeastern coastal plain, the Blackwater is the only one available for recreational use by all.

— that historical consideration should be given to maintaining the Blackwater for future generations.

Some suggestions and recommendations for future protection of the river are included.

INTRODUCTION

The headwater tributaries of the Blackwater River lie in the Conecuh National Forest in southern Alabama and the river proper begins just north of the Florida and Alabama boundaries. The Blackwater River and its five major tributaries flow south through the Blackwater River State Forest to Blackwater Bay, at Milton, Florida.

A visitor to the river first notices the large bars of clean, shifting sand along the river. Streams and rivers with shifting sand bottoms are widespread within the Southeastern Coastal Plains; however, many are disturbed and the sand is biologically unproductive. As will be discussed in this report, the Blackwater River is still in a natural state for almost its entire length, and the shifting sand bottom and other river habitats are very productive.

Headwater tributaries of the Blackwater River have been entirely protected by the Conecuh National Forest since 1936. While the national forest offers multiple use, no agricultural or industrial use is near any of the headwater tributaries.

Almost the entire freshwater portion of the Blackwater River Drainage in Florida has been protected since the early 1930's. The area was originally owned by the U. S. government for a land-use project; however, the land was deeded to the Florida Board of Forestry in 1955. Today only a few small areas along the freshwater portions of the river and its tributaries are locally owned, mostly for agricultural or recreational purposes, and no to little

agricultural runoff enters the river. The remaining area is in the Blackwater River State Forest (administered by the Division of Forestry, Department of Agriculture and Consumer Services). The state forest offers multiple use including controlled operations in timber harvesting; however, the Division of Forestry does not allow harvesting within 100 feet either side of the Blackwater River or 50 feet either side of its tributaries. Based on the above statements, the banks of the freshwater portion of the Blackwater River and its tributaries are almost entirely protected.

The freshwater portion of the Blackwater River has never been channelized or dredged. Except for the occasional removal of fallen trees or log jams for small boats and the building of bridges, the entire aquatic habitats of the river remain natural. To my knowledge no extensive agricultural or industrial pollution has ever entered the freshwater portion of the river. Such cannot be said for any other sand bottom river in northwestern Florida. The only other fully protected sand bottom river in North America is Upper Three Runs Creek in South Carolina which is full protected and managed by E.I. DuPont de Nemours and Company.

Extensive research programs are now in progress at both the Blackwater River by Florida A & M University and Upper Three Runs Creek by Stroud Water Research Center of the Academy of Natural Sciences of Philadelphia. In both studies, emphasis concerns the biological uniqueness of natural sand bottom rivers. In the Blackwater River studies, scientists from many states and over 10

foreign countries have visted the river for biological studies under the Florida A & M University program (as an example, see Soldán 1979).

Stanford and Ward (1979) recently stated that intensive regulation of the world's river systems preceded consideration or understanding of the consequences of such actions. They further noted that rivers were harnessed without regard for the interrelationships of physical and biological components or interactions between terrestrial and aquatic systems. Certainly it is a rare occasion to have left intact a natural river system such as the Blackwater River. It should be scientifically studied in its natural state and then protected for use by future generations.

CHEMICAL AND PHYSICAL ASPECTS

The combined chemical, physical, and geological features of the Blackwater River are summarized by Beck (1973) and this publication is included herein as Appendix I. Chemically the river water is extremely soft, slightly mineralized, and low in dissolved nutrients, a fact that is reflected in sparse growth of aquatic plants. Due to steepheads, most of the normal flow of the river is ground water, not runoff water (surface drainage.) Beck (1965) indicated this results in a temporing effect on extremes of temperatures, keeping the Blackwater River cooler in summer and warmer in winter than waters of other origins. The effects of this modulated temperature on the biological productivity and diversity in the Blackwater River remains to be studied.

Yearly detailed discharge data and water chemistry analyses are published by the U.S. Department of Interior, Geological Survey (1978 and previous years). Recently Bass and Hitt (1977) summarized water chemistry analyses taken during 1976-1977 in a standing crop study of the Blackwater River system.

HISTORICAL AND BIOLOGICAL ASPECTS

The historical and general biological aspects of the Blackwater River are summarized by Peters and Jones (1973) and this publication is included herein as Appendix II. In this paper we identified five natural types of vegetation occurring along or near the Blackwater River. Further we discussed the major aquatic habitats within the Blackwater River Drainage and the insect communities living within the habitats. It is difficult to list the habitats in any river, as one habitat merges to another. Further, preliminary studies indicate the habitats and communities in several tributaries and head waters of the Blackwater River Drainage are significantly different than those in the river proper. Bass and Hitt (1977) indicated the Blackwater River Drainage is divisible into five aquatic environments based on physical features such as current flow, substrate type, depths, and vegetation. While this is correct, studies on aquatic insect communities have further defined the uniqueness of various tributaries and portions of the freshwater areas of the river proper (See Beck & Beck 1974, Berner 1978, and Stark & Gaufin 1979).

Several studies have now appeared which indicate the high diversity and biomass of aquatic insects in the Blackwater River Drainage. Tsui and Hubbard (1979) recently discussed the feeding

habitats of the predaceous nymphs of Dolania americana in the Blackwater River. These nymphs live in the clean shifting sand and the bulk of their food is larval Chironomidae which also live in the sand. The relationship between predator and prey throughout the year is discussed. For most of the year the standing crop of both insects is exceptionally high (from original data and subsequent studies used by Tsui and Hubbard 1979 and Peters and Peters 1977, roughly 4-5 Dolania predators and 6,000-12,000 chironomid prey organisms per square meter in the sand habitat). Tsui and Hubbard (1979) is included herein as Appendix III as documentation that clean, shifting sand habitats are often biologically productive.

The diversity of aquatic insects in the Blackwater River is just becoming known and many new species have not yet been named and described. For example, Berner (1978) revised the mayfly genus Siphloplecton which occurs in North America. Of 8 species in the genus, one is endemic to the Blackwater River and three occur in this river and few other places. One other endemic species of mayfly (Stenacron floridense) from the Blackwater River was described by Lewis (1974) as part of an EPA study. Stark and Gaufin (1979) recently published the stoneflies of Florida. They recorded 26 species in Florida of which 21 species were collected from the Blackwater, more than any other Florida river. Further, although occurring in other states, four of these species were found in Florida only in the Blackwater River.

The diversity of aquatic insects in the Blackwater River Drainage can be seen in the following list of aquatic insects which have been identified. Data is from Peters and Jones 1973, Stark and Gaufin 1979, Beck and Beck 1974, Berner 1978, Lewis

1974, and lists supplied by the following specialists: Drs. Curtis Dunn, Joe Schuh, and Annelle Soponis.

33 species of Odonata (dragonflies and damselflies)

42 " " Ephemeroptera (mayflies)

21 " " Plecoptera (stoneflies)

24 " " Trichoptera (caddisflies), but not all groups have been studied

1 " " Neuroptera

3 " " Megaloptera (dobsonflies and fishflies)

12 " " Corixidae, a family of aquatic Hemiptera (bugs)

20 " " aquatic Coleoptera (beetles)

52 genera of Chironomidae, a family of aquatic Diptera (midges or blind mosquitoes)

We do not have data on other families of Hemiptera or Diptera, some of which are abundant in the Blackwater, nor do we have data on other arthropods (crayfish, fairy shrimp, isopods) which play an important role in the ecology of the river and its tributaries. Based on available data given above, the diversity of invertebrate species in the Blackwater River Drainage is obviously quite high. Few rivers in the world can produce a similar list.

ENDANGERED SPECIES

The Inventory of Rare and Endangered Plants and Animals of Florida is still mostly in preparation. However, enough manuscripts have been published to give a partial list of rare and endangered species occurring in the Blackwater River Drainage. Those species listed below have been selected by me to give a representative

list of various plants and animals, but this list is by no means complete.

1. Plants

Drosera intermedia Hayne in Schrad.	
Water Sundew	RARE
Kalmia latifolia L.	
Mountain Laurel	RARE
Lilium iridollae Henry	
Panhandle Lily	THREATENED
Rhododendron austrinum (Small)	
(no known common name)	THREATENED
Sarracenia leucophylla Raf.	
White-top Pitcherplant	THREATENED

2. Mammals

Felis concolor coryi Bangs	
Florida Panther	ENDANGERED
Ursus americanus floridanus Merriam	
Florida Black Bear	THREATENED

3. Fishes

Except for one report "of doubtful validity" of the Okaloosa darter (*Etheostoma okaloosae*) mentioned in Bass and Hitt (1977), there are no records of endangered species of fish from the Blackwater River. However, in discussing the Blackmouth shiner (*Notropis* new species) from Pond Creek near Milton, Gilbert (1978)

stated: "the range of this species probably encompasses the lower reaches of the adjacent Blackwater and Yellow rivers, as well as freshwater sections of Blackwater Bay itself, and a careful watch should be kept on these areas to ensure that they do not suffer environmental damage."

4. Aquatic Insects *

Pseudiron meridionalis Traver

(no common name) THREATENED

Dolania americana Edmunds and Traver

(no common name) THREATENED

Homoeoneuria dolani Edmunds et al.

(no common name) THREATENED

OTHER CONSIDERATIONS

1. In at least one case (that of the sand-burrowing mayfly Dolania americana), the "threatened" classification applies to the whole family Behningiidae. Nearing extinction (if not already extinct) in Europe and with its status in the Amur and Ussuri basins (border between China and the USSR) in doubt, foreign scientists have been coming to Florida for comparative studies concerning the family (Riek 1973, Soldán 1979).

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* The list of endangered species of invertebrates has not yet been published. Having authored part of the mayfly section, I know some mayfly species which are being included.

2. Of the two protected coastal plain, sand-bottomed rivers in the Southeast (Blackwater River and Upper Three Runs), only the Blackwater is a complete river system available for scenic and recreational purposes. Upper Three Runs is on the Savannah River Plant of E. I. DuPont and admission is restricted. Further, Upper Three Runs is a tributary of the Savannah River and, because of differences in water flow, lacks the clean sand bars that characterize the banks of the Blackwater.

3. The Blackwater and its protected forest banks exist in essentially the same condition now as they did 200 years ago. Preservation for historical purposes should be considered.

FUTURE PROTECTION

For many years the Blackwater River Drainage was isolated and only the local citizens knew of the area. However, in recent years the effects of use are beginning to show as more and more persons are becoming aware of the river. Weekend vacationers alone travel as much as several hundred miles to use the Blackwater recreational facilities, such as the Blackwater River State Park which was developed in the late 1960's.

In the early 1970's the Blackwater River was designated a Florida Canoe Trail by the Florida Department of Natural Resources. Since then the river has had increasing use by canoeists and several professional outfitters rent canoes in the area.

As a professional zoologist and aquatic ecologist, I have noticed many changes along the Blackwater River in the 13 years I have been associated with it. The single most important environmental

change in the past 13 years is the increasing amount of trash and litter left in the river or along the banks by an increasing number of visitors.

While the state park and state forest provide organized recreational facilities, every accessible area to the river is used by visitors and canoeists explore the entire length of the river. In these areas not even minimal facilities are provided for trash. Further, law enforcement is minimal, especially on the weekends when it is needed the most.

If the freshwater portion of the Blackwater River and its tributaries are to remain in their natural state, then an effective plan of protection must be developed. Such a plan should consider the protection of the natural state of both the river and its banks, but allow a visitor maximum use of the area for recreational purposes. This plan is needed now if the Blackwater River Drainage is to remain in its natural state.

The Florida Division of Recreation and Parks is seeking to designate portions of the Blackwater River as a State Wild River. While this state legislative mechanism is available to protect the river, I feel special consideration should be given several points in developing this plan. Some of these are discussed below:

1. The river proper and its tributaries should not be dammed, channelized, or dredges. These restrictions are most important if the physical structure of the river and its banks are to remain unchanged. Further no massive clearing of log jams in the river or its tributaries should be allowed.

2. No agricultural or industrial pollution should be allowed

to enter the freshwater portion of the river or its tributaries. Water quality should be maintained at all times.

3. Effective law enforcement should be maintained on the river system at all times, and more importantly, designation of enforcement responsibility should be clear. All state and county laws should be enforced.

4. Hunting should continue in the Blackwater River area as presently administered by the Florida Game and Fresh Water Fish Commission and the Florida Division of Forestry. I have often been asked if the training and use of dogs by hunters is detrimental to the area. I can see no way the area is harmed by hunting dogs as long as the hunters respect the area.

5. Boats should be allowed to be used on the Blackwater River area as long as they are regulated to fit into the natural environment. Due to the physical nature of the river's bottom small motor boats move slowly in the Blackwater River and do not destroy habitat. As long as motor boat operators regulate their speed, obey litter regulations, and restrict their boats from designated swimming areas, motor boats should continue to be used on the Blackwater River area. Further, canoes do not harm the Blackwater area; however, professional boat rental services and private owners should be well informed on all regulations concerning litter and conservation of the area. (See item 7 for education program.)

6. Sufficient trash containers and other services should be provided for the visitor in the Blackwater area. A visitor will uphold the protection regulations only if he or she is encouraged to do so.

7. An educational program on the natural state of the Blackwater River area and the protective regulations should be developed. All persons concerned in using the Blackwater River area should be fully informed of the program.

8. Any plan of protection for the Blackwater River area should be periodically reviewed by an Advisory Committee composed of state officials, scientists, and local citizens. No plan can be effective until the future protection and use is well planned by all concerned.

CLOSING REMARKS

The Blackwater River exists in its original state today only because of the enlightened management practices of the Forest Service of Florida. The Forest Service deserves a special commendation for preserving the river for this generation. Having already proven its management capabilities, the Florida Forest Service would be my first choice as the agency responsible for preserving the forest and river for future generations.