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Research Report No. 48

A PRELIMINARY ECOLOGICAL STUDY OF AREAS TO BE IMPOUNDED IN THE SALT RIVER BASIN OF KENTUCKY

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Project Number B-016-KY (Completion Report)
Agreement Number 14-31-0001-3087 (FY 1969)
Period of Project - July, 1969 - June, 1970

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University of Louisville Water Resources Laboratory
Louisville, Kentucky

The work on which this report is based was supported in part by funds provided by the Office of Water Resources Research, United States Department of the Interior, as authorized under the Water Resources Research Act of 1964.

October 1971

ABSTRACT

This report includes work that is an extension of Project No. B-005-KY as reported in Research Report No. 43 of the University of Kentucky Water Resources Institute. That project was initiated in April 1968 as Project No. A-019-KY with principal emphasis on physical, chemical, and biological characteristics of the main stem of the Salt River upstream from the proposed damsite for Taylorsville Lake, an impoundment of about 3,600 acres at seasonal pool. The report includes descriptions of an additional 13 stations along the stream, bringing to 38 the number of permanent collecting sites.

Values for dissolved oxygen ranged from 60% to 120% of saturation, turbidities ranged from 5 to 650 pp, SiO_2, total alkalinities ranged from 130 to 220 ppm as $CaCO_3$, pH from 6.8 to 8.4, and total dissolved solids ranged from 40 to 160 mg/l. Conductivity ranged from 100 to 350 micromhos, nitrate nitrogen from 0.1 to 9.9 mg/l, and orthophosphate from 0.2 to 2.9 mg/l. Iron and manganese were consistently present in low quantities.

Estimates of standing crop of bottom organisms range from 0 on the bare limestone bottom to more than 275 pounds per acre in more suitable areas. The profusion and species diversity of bottom organisms indicate a healthy stream. More than 50 species of fishes have been collected and the standing crop of those vertebrates ranged from 4.7 to 217.8 pounds per acre. More than 100 species of birds have been identified in the area along with many species of reptiles, amphibians, and mammals.

Average land values in the area surrounding the proposed lake site have not increased more rapidly nor to a greater extent than comparable lands some distance from the site. The lands with the highest values are those nearest the large centers of population.

KEY WORDS: Ecology, Water Quality, Environmental Effects, Limnology, Planning, Preimpoundments, Aquatic Habitats, Eutrophication, Evaluation

ACKNOWLEDGMENTS

We are most grateful to our graduate students Edmond J. Bacon, Paul Higgins, Robert D. Hoyt, J. Douglas Knoop, Richard L. Lattis, Charles R. Liston, Jerry S. Parsons, Frank Quick, John D. Woodling, Harry H. Woodward, and John H. Yopp for their assistance in the field and laboratory work, especially in collecting and sorting samples and in collating data and performing chemical analyses. We are most appreciative of the assistance of Shirley Viers and Sally Schuler for the many ways they helped, especially in compiling data and typing reports.

This study could not have been undertaken without the cooperation and financial assistance of the U. S. Department of the Interior, Office of Water Resources Research, afforded through the Water Resources Institute of the University of Kentucky, we extend our gratitude to Dr. Robert A. Lauderdale, Director of the Institute.

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INTRODUCTION

This report includes work that is an extension of Project No. B-005-KY for the period from 1 July 1969 through 30 June 1970. In the original proposal it was stated that the U. S. Army Corps of Engineers had planned to construct a dam and impound a reservoir on each of the three principal branches of the Salt River, Taylorsville Reservoir on the Salt River, Camp Ground Reservoir on the Beech Fork, and Howardstown Reservoir on the Rolling Fork. The plans for the proposed Howardstown Reservoir have been abandoned because of public opposition to the project.

This study included data from the mainstem of the Salt River, and from the Chaplin River and the Beech Fork upstream from the proposed dam sites. This covers about 110 miles of the upper reaches of the Salt River, the entire Chaplin River (about 90 miles of stream) which is tributary to the Beech Fork, and about 60 miles of the Beech Fork. The objectives of this study were to continue: 1) to collect and catalogue specimens of all kinds of algae in the streams, 2) to collect and catalogue specimens of all kinds of vascular plants in the stream as well as the riparian vegetation, 3) to collect water samples at predetermined stations and to analyze them for appropriate anions and cations and for physical characteristics, 4) to collect fishes and to determine the relative abundance and distribution of the different species, and 5) to gather information on changes in the economics and agriculture of the area.

DESCRIPTION OF THE STUDY AREA

A description of the mainstem of the Salt River, also known as the North Fork of the Salt River, was given in the Completion Report for Project No. B-005-KY, Agreement No. 14-01-0001-1908 for the period 1 July 1968 through 30 June 1969. In addition to the mainstem of the Salt River, collecting and sampling stations have been established on Brashears Creek, Beech Creek, Little Beech Creek, Crooked Creek, Hammond Creek, and Ashes Creek, and on some of the tributaries of those streams.

Brashears Creek (Fig. 1) is the first large tributary entering the Salt River downstream from the proposed damsite for Taylorsville Reservoir. Brashears Creek has its origin from three principal tributaries: 1) Bullskin Creek rises in Henry County about 2 miles west of Eminence near the source of the Little Kentucky River and flows south southwest through Shelby County to join Clear Creek about 4 miles southwest of Shelbyville, 2) Clear Creek rises in north central Shelby County near Pleasureville and flows southeast through Shelbyville to its union with Bullskin Creek to form the origin of Brashears Creek; just north of Shelbyville, Clear Creek is impounded to form Lake Shelby, and 3) Guist Creek rises near Bagdad in northeastern Shelby County and flows southwest to enter Brashears Creek near the community of Rivals in north central Spencer County. From the union of Bullskin and Clear creeks, Brashears Creek flows southwest to enter the Salt River at Taylorsville.

Beech Creek (Fig. 1) rises in southeastern Shelby County and flows west southwest to enter the Salt River about 6 river miles upstream from Taylorsville. Little Beech Creek (Fig. 1) rises in northeastern Spencer County and flows southwest to enter the Salt River a little more than a mile upstream from the mouth of Beech Creek. Crooked Creek (Fig. 1) rises about 3 miles due south of the source of Beech Creek and flows southwest forming the boundary between Anderson and Shelby counties and Anderson and Spencer counties before joining the Salt River in Van Buren at the juncture of Anderson, Nelson, and Spencer counties. Hammond Creek (not shown in Fig. 1) rises just northwest of Lawrenceburg and empties into the Salt River at about Salt River Mile 91. Hammond Creek receives the primary treated effluent from the sewage disposal system of Lawrenceburg.

Ashes Creek is the only principal tributary on the south side of the Salt River to receive any detailed study during this period. Ashes Creek rises from several sources in northeastern Nelson County about 4 miles east of Bloomfield and flows northwest into Spencer County where it receives two

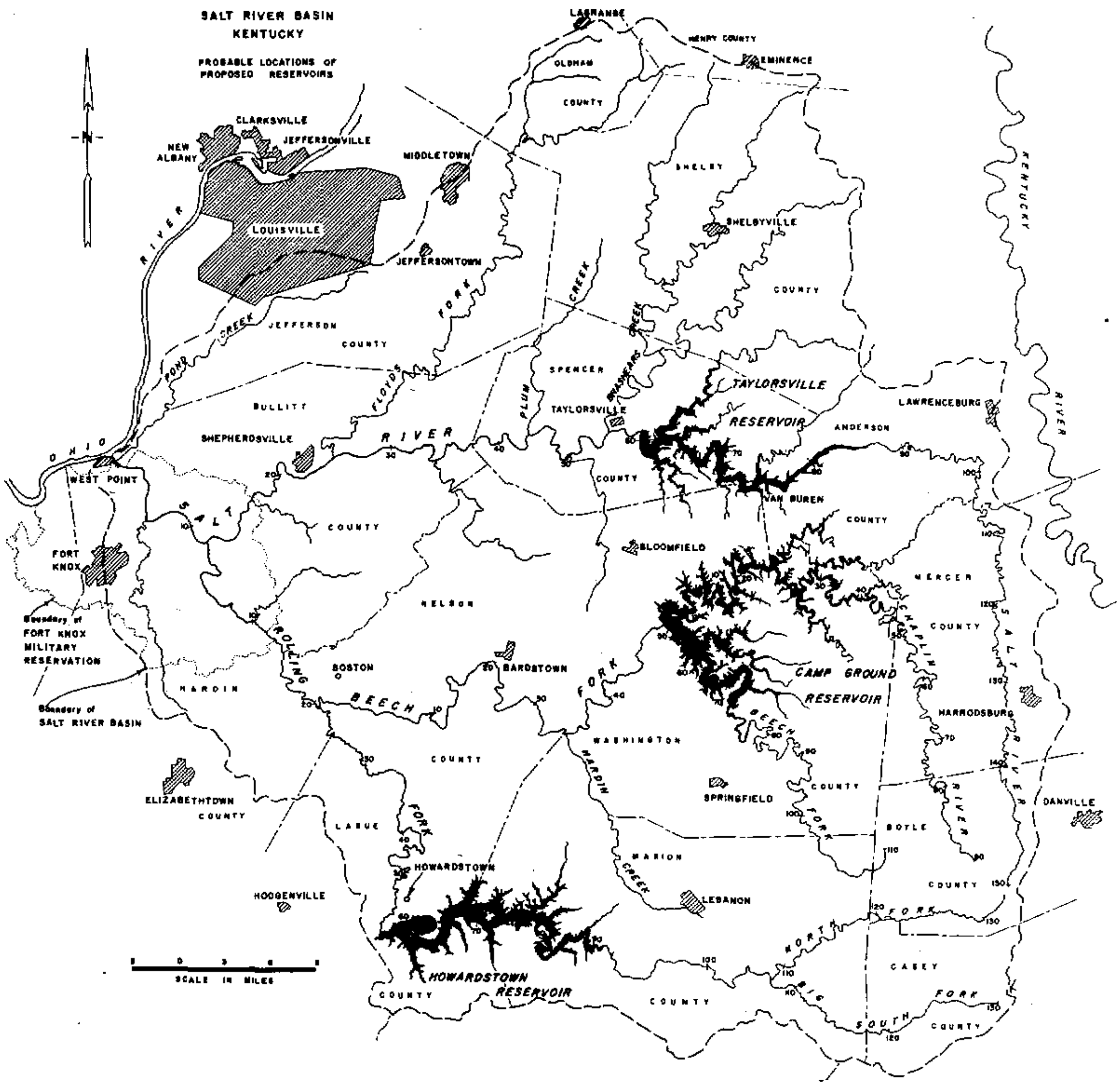

Fig. 1. The Salt River Basin showing the Salt River, the Beech Fork, the Chaplin River, together with the sites for the proposed reservoirs. The plans for constructing Howardstown Reservoir have been abandoned.

principal tributaries, Doe Run and Jacks Creek, before it empties into the Salt River about 2 miles upstream from the proposed damsite.

The following stations (Fig. 2) have been established on these streams and are numbered consecutively from those described in the Completion Report for Contract No. B-005-KY, Agreement No. 14-01-0001-1908.

Station 26. On Brashears Creek, about 100 yards upstream from its concluence with the Salt River. Here the stream channel has been highly modified; the east bank is a levee for the protection of Taylorsville against flooding, and the west bank is a dirt road. A rubble-covered riffle leads into a shallow pool. Below the pool a rubble bar separates the pool from the back water of the Salt River.

Station 27. Two rubble-bottomed riffles separated by a narrow island lead into a long pool 15 to 20 m wide and 1.5 to 2.0 m deep on Brashears Creek about 6.5 miles upstream from its confluence with the Salt River. The riffles are 11 m wide and are protected by an overhanging canopy of trees.

Station 28. On Brashears Creek at Rivals, 14.5 miles upstream from the Salt River at the mouth of Buck Creek. There is a well-used ford at the southern end of a clearing with a long series of pools downstream from the ford. The stream is bordered by the black willows (*Salix nigra*). The stream is about 20 m wide and the water in the pools ranges to a meter in depth.

Station 29. On Brashears Creek, 20.8 miles above its confluence with Salt River at the bridge on Highway 148. About 90 m upstream from the bridge, Pickett's Dam forms a pool about 0.6 mile long. Below the dam the stream has a relatively steep gradient and forms a long rubble-bottomed riffle about 25 m wide. The stream is almost completely shaded by a canopy of trees during the summer.

Station 30. At the source of Brashears Creek, formed by the confluence of Bullskin and Clear creeks, about 40 miles upstream from its confluence with the Salt River. Clear Creek merges with Bullskin Creek and continues as a ruffle. Trees have fallen into the stream and have trapped floating debris.

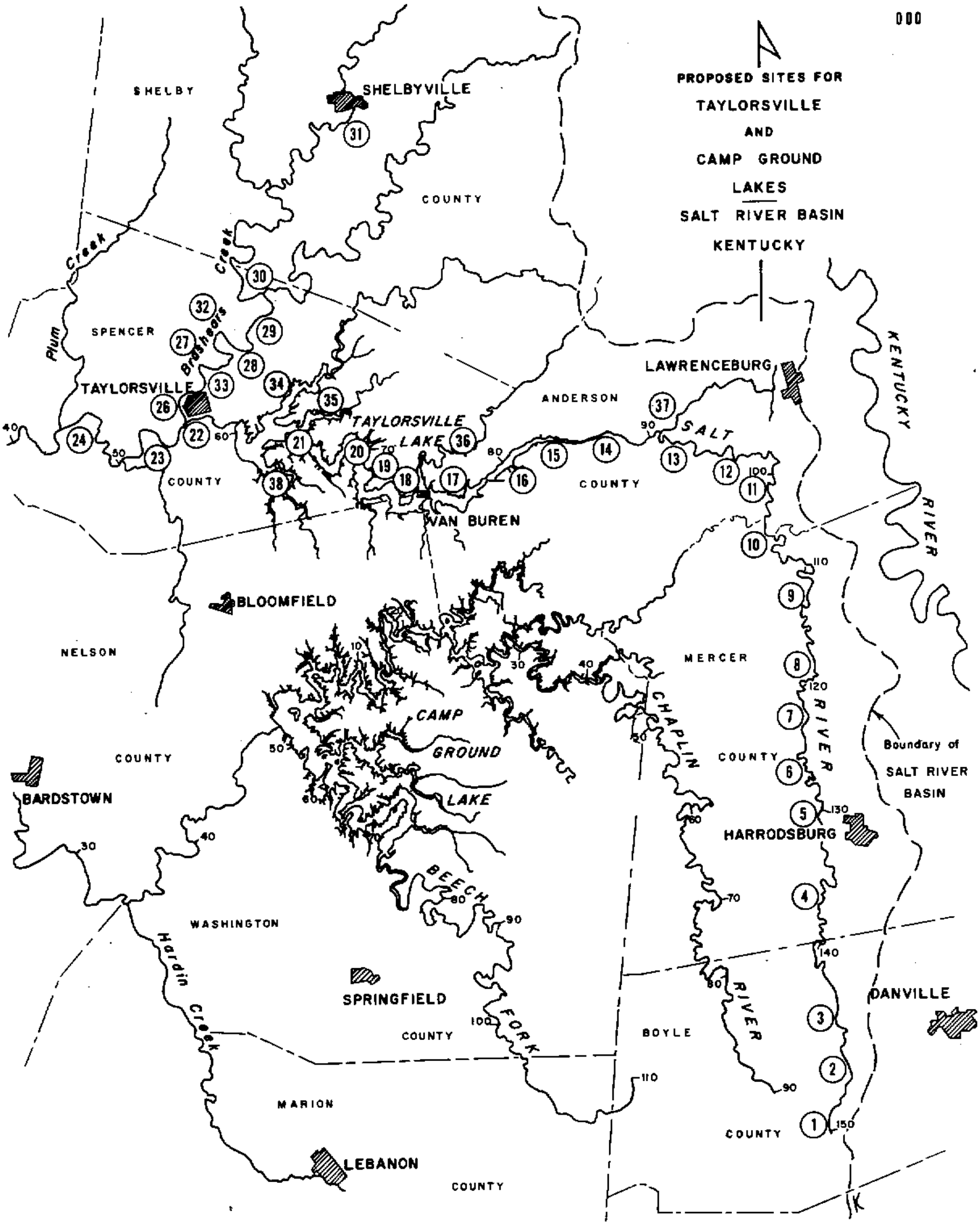

Fig. 2. The Salt River, Beech Fork, and Chaplin River, showing the locations of permanent collecting stations 1 through 38. Station 25 is at Shepherdsville, about 40 miles downstream from the damsite for Taylorsville Reservoir.

At the confluence, Bullskin Creek is about 8 m wide and the bottom is bedrock whereas Clear Creek consists of two narrow channels separated by an island several meters wide. Immediately downstream from the confluence, the bottom is covered with rubble except for a narrow chute in midstream. The banks are steep, with exposed roots of sycamore trees serving as stabilizers.

Station 31. On Clear Creek, 4.8 miles upstream from its confluence with Bullskin Creek and 0.6 mile downstream from the outfall of the Shelbyville sewage disposal plant. The creek is about 12 m wide, less than 0.5 m deep, and there is a hedgerow on either side.

Station 32. On Buck Creek, about 75 m upstream from Station 27 where Buck Creek empties into Brashears Creek. The bottom is rubble and the stream flows through pastureland.

Station 33. On an unnamed stream that empties into Brashears Creek about 3.1 miles upstream from the Salt River. The sampling station is a few meters upstream from the mouth of the stream where it flows through a deep gully 2-3 m wide that is completely canopied by trees.

Station 34. On Beech Creek, in east central Spencer County about 1 stream mile north of the bridge that spans the creek on Highway 248 and 1.9 miles above its confluence with the Salt River. The flow is variable and apparently is intermittent in times of drought. It consists of a series of chutes and a long riffle leading into a pool. The bottom is shale with rubble in the riffles and is smooth in the chutes. The stream is about 10 m wide at the ford and from a few centimeters to a meter deep.

Station 35. On Little Beech Creek, in east central Spencer County about 0.7 mile southwest of Bethlehem Church and 0.5 mile above its confluence with the Salt River. The reference point is the bridge that spans the creek for Highway 248. The stream is about 10 m wide and consists of a large pool that leads into a long riffle. The pool is about a meter deep and the riffle about 0.3 m at its deepest part.

Station 36. On Crooked Creek, about 0.3 mile upstream from its confluence with Salt River at Van Buren. This station was used only for collecting fishes. No chemical or physical data are available. During periods of drought, the streambed is dry.

Station 37. On Hammond Creek, just upstream from the bridge on Highway 44 that spans the stream. This station is about 4 miles upstream from its confluence with the Salt River and about 10 miles downstream from where Hammond Creek receives the primary treated effluent from the sewage disposal facility at Lawrenceburg. The stream at this point is about 10 m wide with a bedrock bottom and some small rubble, and is no more than 15-20 cm deep.

Station 38. On Ashes Creek about 0.6 mile upstream from its confluence with Salt River near the mouth of Jacks Creek in south central Spencer County. The reference point is the bridge on Highway 1066 that spans Ashes Creek. The stream is about 4 m wide and 0.2-0.5 m deep with a bedrock bottom. As with many other streams in the area, it may be intermittent during the dry summer months.

In addition to these stations, sites have been used for collecting fishes on the Chaplin River (22 collections) and the Beech Fork (19 collections). Some of these sites will be selected as permanent sampling stations for bottom fauna and water chemistry. However, none of these permanent stations have been established as yet. They will be established during the next fiscal year and will be described in the Completion Report for B-022-KY, Agreement No. 14-31-0001-3286 for the period 1 July 1970 through 30 June 1972.

The Beech Fork is joined by its principal tributary, the Chaplin River, a little more than 2 miles upstream from the town of Maud in northwestern Washington County, and those streams provide the drainage system for the proposed Camp Ground Reservoir.

The Chaplin River rises in central Boyle County about 3 miles northwest of the source of the mainstem of the Salt River (Fig. 1). From that point it flows in a north northwesterly direction to the Mercer-Washington County line where it turns west northwestward to form part of the Anderson-Washington County line and then west southwestward forming a portion of the Nelson-Washington County line, and empties into the Beech Fork about 50 miles above the confluence of the Beech Fork and the Rolling Fork. The total length of the Chaplin River is about 90 miles.

The Beech Fork rises in west central Boyle County about 6 miles due west of the source of the Chaplin River (Fig. 1). From that point it flows in a generally northwesterly direction through Boyle, Marion, and Washington counties to receive the waters of the Chaplin River about 2 miles northeast of Maud and about a mile upstream from the proposed dam site for Camp Ground Reservoir. Below the damsite, the Beech Fork meanders in a westerly direction for about 50 miles through Nelson County and empties into the Rolling Fork near the town of Boston, 20 miles upstream from the confluence of the Rolling Fork and the Salt River.

METHODS

Temperatures were taken with calibrated mercury stem thermometers and the thermistor element of a Yellow Springs Model 54 Oxygen Meter. Readings for dissolved oxygen were taken with the same meter and were checked against a standard determined by the Alsterberg modification of the Winkler method. Total hardness and alkalinities were determined following procedures described in the 12th Edition of Standard Methods for Examination of Water and Wastewater. Alkalinities were also determined potentiometrically with a Corning Model 10 *p*H meter. Major anions and cations were determined using accepted procedures in wet chemistry with colorimetric analyses in a Bausch and Lomb Spectronic 20 spectrophotometer.

Benthic samples were collected with nets, dredges, and Surber samplers in an effort to obtain qualitative as well as quantitative information on the distribution and relative abundance of the various organisms. Fish were collected by electroshocking, netting, seining, and by using chemicals. Samples of water, bottom fauna, riparian vegetation, and aquatic vertebrates were taken at least once at each of the described stations during the study period. In addition, records were kept of all amphibians, reptiles, and birds seen in the study area. From these data it has been possible to continue to provide a fairly complete list of the biota of the Salt River Basin. Lists of algae, vascular plants, bottom fauna, and fishes were provided in the Completion Report for Project No. B-005-KY, Agreement No. 14-01-0001-1908 and will not be repeated here. Several species have been added to some of the lists and those "new" species will be included in a later report.

PHYSICAL AND CHEMICAL DATA

Data on the physical and chemical characteristics of the stream, along with the biological data, continue to give the impression of a fairly clean, healthy stream. Water temperature closely parallelled air temperatures, and ranged from 1.0 C in January and February to 27.0-29.0 C in late July and August. Values for dissolved oxygen, as observed in percentage saturation, ranged from 60% in late July and August to 120% in January. We have not encountered values below 60% saturation; even with the high midsummer temperatures, the values remained near 80% most of the time. The effects of domestic sewage effluents are localized at Harrodsburg where they are emptied into a small, unnamed tributary to the Salt River, and at Lawrenceburg where they are emptied into Hammond Creek. These effluents do not appear to have a marked effect on the mainstem of the Salt River.

The level of water in the Salt River rises very rapidly during the following heavy rainfalls largely because of the impermeable nature of the underlying shales and limestones (Hendrickson and Krieger 1964). Water levels fluctuate most rapidly following spates, and these fluctuations appear to be a major factor influencing the distribution of the stream biota. The turbidity of the water increases markedly with increased flow and runoff.

Turbidities, as measured with a Hellige turbidimeter (20-mm tube) ranged from 5 to 650 parts per million SiO_2, the latter occurred immediately following a 3-inch rainfall.

In the fall (November), rains tend to increase nutrient levels (nitrate nitrogen and orthophosphate), but cations tend to be present in lower concentrations, probably reflecting the influence of dilution. In spring (April, May), however, the nutrient levels decrease with the onset of runoff as do the concentrations of cations. The increases in the fall may result from agricultural fertilizers and decaying vegetation that leach nutrients into the streams. Increased runoff and increased volume of stream flow also affect concentrations of total alkalinity, conductivity, and total dissolved solids. The effects of such dilution, along with the likely increase in nutrients, is not predictable and not easily interpreted. Total alkalinities ranged from 130 to 220 ppm as $CaCO_3$, which, with a pH of 6.8 to 8.4, indicates that it is chiefly the biocarbonate ion (HCO_3^-) that accounts for the observed values. Noncarbonate hardness has remained low, ranging from 10 to 20 ppm. Such alkalinities provide a basis for characterizing the Salt River as medium hard to hard, and in a limnetic situation is likely to be indicative of a potentially productive lake.

Total dissolved solids (residue at 180 C) ranged from 40 to 160 mg/l. The increased residues usually are correlated with increased stream flow and increased turbidity. Conductivity (specific conductance) ranged from 100 to 350 micromhos, and frequently is affected inversely with increased volume of discharge largely because of the dilution factor associated with rapid runoff. This is not always related solely to runoff since the increased runoff may bring additional electrolytes into the stream thereby increasing the conductance. Thus, there is a complex and unpredictable relationship between dissolved solids, conductivity, and volume of flow. One thing does seem clear; the Salt River does not seem to be appropriately named inasmuch as no saline waters have been encountered during this study.

Concentrations of nitrate nitrogen ranged from 0.1 to 9.9 mg/l and orthophosphate from 0.2 to 2.9 mg/l. The high values for nitrates were from stations near cultivated field that had been treated with inorganic fertilizers; the changes in values for nitrates correspond with periods of farming activity. The high values for phosphates occurred in October and November apparently due to the decomposition of large quantities of leaves, and to fertilizers leached from the fields. Nitrites remained low throughout the year and ranged from 0.01 to 0.05 mg/l.

Iron and manganese were present in low concentrations and ranged from 0.05 to 1.46 and 0.04 to 0.80 mg/l, respectively. Although these concentrations have little effect on the lotic environment, it is possible that those two cations in concert could cause adverse effects in a limnetic situation whenever low concentrations of oxygen develop in the deeper water (Ruttner 1963). If such conditions developed following impoundment the water quality for domestic use could be affected by producing undesirable tastes and causing objectionable stains (Mackenthum 1969).

Samples from Brashears Creek and its tributaries provided data that closely parallel those for the mainstem of Salt River. A detailed study of the biological, chemical, and physical aspects of Brashears Creek has been initiated, and the result of that study will provide data for a Master's thesis by one of the Graduate Research Assistants supported by this project. Samples from Beech Creek (Station 34, Fig. 2), Little Beech Creek (Station 35), Hammond Creek (Station 37), and Ashes Creek (Station 38) provided data that closely parallel those from Salt River. Such samples were taken intermittently because of the intermittent nature of the streams, and presentation of specific data from those samples is not warranted at this time.

BIOLOGICAL DATA

Among the aquatic plants to be added to the previous list, the red alga Lemanea was collected from three stations in rapid, turbulent water. The aquatic moss Fissidens julianus was collected from riffles at several stations but is not widespread in the river. Perhaps the most outstanding community of aquatic plants, as mentioned in the Completion Report for B-005-KY, is in the form of extensive stands of water willow Dianthera (= Justicia) americana which virtually choke the stream in many places. Those stands are so dense that they frequently give the river a braided appearance. It is hoped that an intensive study of the standing crop biomass of this species can be undertaken and its contribution to the overall economy of the river ascertained. Along with water willow, black willow Salix nigra forms a principal component of the emergent vegetation in the stream. Sycamores and oaks are the common riparian trees.

Sorting and identifying benthic organisms is tedious and time consuming, but along with the physical and chemical data, the abundance and diversity of bottom organisms provide an excellent indication of the relataive cleanness of a stream. Over much of the length of the stream, colonies of the freshwater sponge Spongilla lacustris have been found, and the colonies frequently are present in profusion. Those sponges are fed upon by the spongilla fly Sisyra vicaria, and at least three species of caddis flies of the genus Athripsodes not only feed upon them but use fragments of the sponges to adorn their cases. Several species of chironomids also occur in the sponges. The abundance of these sponges attests to the good quality of the water and the conditions that prevail, since such sponges are rather sensitive to environmental pollution (Pennak 1953:85).

Among the insect larvae, the caddis flies (Trichoptera) and the true flies (Diptera) are predominant. The caddis flies Hydropsyche betteni and Cheumatopsyche aphanta are widely distributed in the river, and some more sensitive species as Chimarra obscura and Leptocella exquisita occur locally. Neophylax nacatus and Ironoquia punctatissima apparently are confined to the small tributaries.

Chironomids are the most abundant dipterous insects, and 32 species have been identified so far; many others remain to be identified. Pseudochironomus richardsoni is the major species in the headwaters, and Microtendipes pedellus, Stichtochironomus sp., Glyptotendipes lobiferus, and Chironomus staegeri are widely distributed, especially in sandy-silt deposits where the current is reduced. Xenochironomus scopula, a river species, has been reared fór the first time in our laboratory; its larvae burrow into the water-soaked shales and honeycomb the rock with their tunnels. The Orthocladiinae are an important segment of the chironomid fauna, but the unsatisfactory state of the taxonomy of this subfamily has thwarted efforts at complete identification and their associations in this stream community.

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Mayflies (Ephemeroptera) and stoneflies (Plecoptera) are relatively abundant. Hexagenia limbata occurs in the silty backwaters, whereas members of the genera Stenonema, Ephemerella, Epeorus, Leptophlebia, Potamanthus, and Caenis are widely distributed. Caenis diminuta is a headwater form and Ephemerella sp. frequents the algal colonies. The winter stoneflies Allocapnia vivipara and Taeneoptera parvula, along with six other species, comprise the plecopteran fauna and have a spotty distribution throughout the stream system.

Among the beetles, Psephenus herricki is the most widely distributed, although the elmid genus Stenelmis occurs locally in large numbers. The pyralid moth Paragyractic fulicalis is relatively abundant in riffles where it brouses on encrusting algae, and the larvae remain sheltered beneath their silken webs.

Damselflies of the genus Calopteryx and dragonfly larvae on the genera Gomphus and Boyeria are frequently taken. Three neuropterid larvae, in addition to Sisyra vicaria, are common in riffles and pools, they are Corydalus cornutus, Chauliodes, sp., and Sialis infumata.

Several crustaceans, especially the crayfish Orconectes rusticus and the scud Lirceus lineatus are fairly common.

Another organism that is considered sensitive to pollution, the bryozoan Plumatella repens, is widely distributed and harbors a number of commensal insect larvae, among which are several unidentified species of chironomids that live in the coriaceous ectocyst.

More than 300 Surber square-foot samples have been processed in identifying the above-mentioned bottom organisms. From these samples, the estimates of standing crop range from 0 pounds per acre in July and August to about 275 pounds per acre in April and May. These estimates compare favorably with crops from stream studies elsewhere (Needham, 1940; Needham and Usinger, 1956; Hynes, 1969).

In addition to the bottom samples, 41 collections of fishes have been taken from the Beech Fork and Chaplin River and some of their tributaries along with further collections from sites on Salt River sampled earlier. Although no other species, in addition to the 52 listed in the Completion Report for B-005-KY, were collected, much information on the relative abundance and distribution of the different species has been obtained (Hoyt et. al. 1970). In all likelihood, some species will be added to the list within the next few years as collections are made further downstream and in tributaries.

Ten species of fishes were taken in more than half the collections as follows: bluntnose minnow (Pimephales notatus) and green sunfish (Lepomis cyanellus) 89%, longear sunfish (Lepomis megalotis) 85%, fantail darter (Etheostoma flabellare) 67%, stoneroller (Campostoma anomalum) and rosefin shiner (Notropis ardens) 65%, bluegill (Lepomis macrochirus) 59%, creek chub (Semotilus atromaculatus) 52%, common shiner (Notropis cornutus) and johnny darter (Etheostoma nigrum) 50%. On the other hand, the most numerous species taken in all collections was the longear sunfish followed in order by the bluntnose minnow, rosefin shiner, green sunfish, and stoneroller. Estimates of standing crops of fishes ranged from 4.7 to 217.8 pounds per acre and compare favorably with those reported by Turner (1959, 1967) for other streams in Kentucky.

A list of birds sighted in the Salt River area by personnel of the Water Resources Laboratory is appended to this report. The nomenclature follows that of Mengel (1965). That list will be published in the open literature. A list of amphibians and reptiles of the area is being compiled. The assessment of

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LAND VALUES IN THE SALT RIVER AREA

During the year, opinions were sought from professional real estate agents, county tax commissioners, farmers, soil conservationists, and private citizens in Anderson, Bullitt, Nelson, Shelby, and Spencer counties regarding the economic impact of impounding the Salt River near Taylorsville. Many persons, both farmers and nonfarmers, professed apprehension as to whether the dam would be constructed. Furthermore, there was noticeable feeling that if it were to be built, construction would not begin within the next few years. Most persons interviewed stated that there was no immediate need for expansion of shopping and recreational facilities and that any major change in the economy of the area would not take place in the forseeable future. There has been no major change within the past few years in the economic structure of the area based on the proposed construction of the impoundment. Many townspeople believed property taxes would increase and that schools would receive needed improvements and public facilities would expand as needed. Such changes could be handled whenever they occurred. Tax commissioners apparently assess land values according to use. Most frequently, assessment of a parcel of land changes only when the land is sold. Small parcels of land, 50 acres or smaller, will likely show the greatest shift in value since they are more easily financed and lend themselves readily to being subdivided. It is expected there will be pressure to increase prices of farmland with the added demand for dewlling sites and recreation.

As part of the study, 135 farms were chosen from tax rolls to sample changes in value from January 1966 through July 1969. Each farm was readily accessible to the proposed Taylorsville Reservoir and was selected on the basis of minimal improvements where possible so that actual value of the land could be determined. These data provided information on current land valuation and changes over the past years, and also provided a basis for speculation on what prices might be asked and obtained later on when land had to be purchased for the reservoir site.

The sample included 30 representative farms northeast of but no farther than 10 miles from the proposed reservoir site, 25 comparable farms to the northwest, 25 to the southeast, 25 to the southwest, and 40 farms within a mile of the proposed site. The average values of 76 of those farms for each year from 1966 through 1969 were estimated by the individual farmers (Table 1). Those estimates indicate that the land nearest Louisville is considered the most expensive and is followed in order by land nearest Fort Knox (southwest), and Lexington and Frankfort (northeast). The average assessed valuations for those same farms taken from the tax rolls (Table 2) are considered extremely conservative on the basis of the "highest and best use" theory of tax assessments. The real estate agents, who are well aware of the importance of the likely development of the area following impoundment of the Salt River, were of the opinion that the values in Table 1 are much more realistic than those in Table 2. Some agents even ventured that the values in Table 1 might be conservative.

None of the information contained in this report has been published in the open literature. However, an intensive study of the physiochemical and biological aspects of Brashers Creek has served as the basis for a master's thesis by a Graduate Research Assistant, John D. Woodling.

From the information gathered between 1 April 1968 and 30 June 1970 several general conclusions can be drawn:

1. The main stem of the Salt River of Kentucky is a relatively healthy stream as indicated by the abundance and diversity of the aquatic biota.

Table 1. Average values per acre of unimproved farmlands in the vicinity of the proposed Taylorsville Reservoir for the years 1966 through 1969 as estimated by farmers on 76 parcels of land. Lands within a mile of the proposed reservoir site are considered contiguous.

Year	Northeast	Northwest	Contiguous	Southeast	Southwest
1966	220	240	200	210	230
1967	230	255	210	220	245
1968	250	270	225	235	260
1969	260	280	240	245	270

Table 2. Average assessed values per acre of the 76 parcels of land listed in Table 1 as taken from the tax rolls. Lands within a mile of the proposed reservoir site are considered contiguous.

Year	Northeast	Northwest	Contiguous	Southeast	Southwest
1966	198	223	184	186	204
1967	205	232	188	190	209
1968	212	245	196	197	220
1969	218	248	201	203	227

The primary sources of pollution are the sewage treatment outfalls from Harrodsburg and Lawrenceburg along with the runoff from cultivated fields and farmlands in the drainage area.

2. The physical and chemical characteristics of the water in the main stem is similar to those of the principal tributaries upstream from the designated damsite for Taylorsville Lake as well as for Brashears Creek, a large tributary that enters the Salt River at Taylorsville, about 3 miles downstream from the damsite.

3. Changes in land values within a mile of the proposed lake were not markedly different than those in other parts of Kentucky between 1966 and 1970. There was a continual, gradual increase in values with the highest priced land nearest Louisville, the major population center of the state. There is no apparent overriding concern among the populate regarding the imminent construction of the impoundment.

APPENDIX A

PRELIMINARY CHECKLIST OF BIRDS IN SALT RIVER AREA

ANSERIFORMES

Anatinae

Anas platyrhynchos Mallard Duck
Anas rubripes Black Duck
Aix sponsa Wood Duck

FALCONIFORMES

Cathartidae

Coragyps atratus Black Vulture
Cathartes aura Turkey Vulture

Accipitridae

Buteo jamaicensis Red-tailed Hawk
Buteo lineatus Red-shouldered Hawk

Falconidae

Falco peregrinus Peregrine Falcon
Falco sparverius Sparrow Hawk

GALLIFORMES

Phasiandae

Colinus virginianus Bobwhite

CICONIIFORMES

Ardeidae

Ardea herodius Great Blue Heron
Butorides virescens Green Heron
Nyctanassa violacea Yellow-crowned Night Heron
Nycticorax mycticorax Black-crowned Night Heron

CHARADRIIFORMES

Charadriidae

Charadrius vociferus Killdeer

COLUMBIFORMES

Columbidae

Columba liva Rock Dove
Zenaidura macroura Mouring Dove

CUCULIFORMES

Cuculidae

Coccyzus americanus Yellow-billed Cuckoo
Coccyzus erythropthalmus Black-billed Cuckoo

STRIGIFORMES

Strigidae

Bubo virginianus Great Horned Owl
Otus asio Screech Owl
Strix varia Barred Owl

CAPRIMULGIFORMES

Captimulgidae

Caprimulgus carolinensis Chuck-wills-widow
Caprimulgus vociferus Whip-poor-will
Chordeiles minor Common Nighthawk

APODIFORMES

Apodidae

Chaetura pelagica Chimney Swift

Trochilidae

Archilochus colubris Ruby-throated Hummingbird

CORACIIFORMES

Alcedinidae

Megaceryle alcyon Belted Kingfisher

PICIFORMES

Picidae

Centurus carolinus Red-bellied Woodpecker
Colaptes auratus Yellow-shafter Flicker
Dendrocopos pubescens Downy Woodpecker
Dendrocopus villosus Hairy Woodpecker
Dryocopus pileatus Pileated Woodpecker
Melanerpes erythrocephalus Red-headed Woodpecker
Sphyrapicus varius Yellow-bellied Sapsucker

PASSERIFORMES

Tyrannidae

Contopus virens Eastern Wood Pewee
Empidonax minimus Least Flycatcher
Empidonax virescens Acadian Flycatcher
Myiarchus crinitus Great Crested Flycatcher
Sayornis phoebe Eastern Phoebe
Tyrannus tyrannus Eastern Kingbird

Alaudidae

Eremophila alpestris Horned Lark

Hirundinidae

Hirundo rustica Barn Swallow
Petrochelidon pyrrhonota Cliff Swallow
Progne subis Purple Martin
Riparia riparia Bank Swallow
Stelgidopteryx ruficollis Rough-winged Swallow

Corvidae

Cyanocitta cristata Blue Jay
Corvus brachyrhynchos Common Crow

Paridae

Parus bicolor Tufted Titmouse
Parus carolinensis Carolina Chickadee

Sittidae

Sitta carolinensis White-breasted Nuthatch

Certhiidae

Certhia familiaris Brown Creeper

Troglodytidae

Thryothorus ludovicianus Carolina Wren
Troglodytes aedon House Wren

Mimidae

Dumetella carolinensis Catbird
Mimus polyglottos Mockingbird
Toxostoma rufum Brown Thrasher

Turdidae

Hylocichla guttata Hermit Thrush
Hylocichla mustelina Wood Thrush
Sialia sialis Eastern Bluebird
Turdus migratorius Robin

Sylviidae

Polioptila caeurulea Blue-gray Gnatcatcher

Bombycillidae

Bombycilla cedrorum Cedar Waxwing

Laniidae

Lanius ludovicianus Loggerhead Shrike

Sturnidae

Sturnus vulgaris Starling

Vireonidae

Vireo flavifrons Yellow-throated Vireo
Vireo gilvus Warbling Vireo
Vireo griseus White-eyed Vireo
Vireo olivaceus Red-eyed Vireo

Parulidae

Dendroica coronata Myrtle Warbler
Dendroica dominica Yellow-throated Warbler
Dendroica magnolia Magnolia Warbler
Dendroica petechia Yellow Warbler
Geothyypis trichas Yellowthroat
Icteria virens Yellow-breasted Chat
Protonctaria citrea Prothonotary Warbler
Setophraga ruticilla American Redstart

Ploceidae

Passer domesticus House Sparrow

Icteridae

Agelaius phoeniceus Red-winged Blackbird
Euphagus carolinus Rusty Blackbird
Molothrus ater Brown-headed Cowbird
Quiscalus quiscula Common Grackle
Sturnella magna Eastern Meadowlark

Thraupidae

Piranga olivacea Scarlet Tanager

Fringillidae

Ammodramus savannarum Grasshopper Sparrow
Carpodacus purpureus Purple Finch
Junco hyemalis Slate-colored Junco
Melospiza melodia Song Sparrow
Passerella iliaca Fox Sparrow
Passerina cyanea Indigo Bunting
Pipilo erythrophthalmus Rufus-sided Towhee
Pooecetes gramineus Vesper Sparrow
Richmondena cardinalis Cardinal
Spinus pinus Pine siskin
Spinus tristis American Goldfinch
Spizella passerina Chipping Sparrow
Spizella pusilla Field Sparrow
Zonotrichia albicollis White-threated Sparrow
Zonotrichia leucophrys White-crowned Sparrow

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