

WHITE OAK CREEK ECOLOGICAL STUDY
ANNUAL REPORT
Fiscal Year - 1950

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WHITE OAK CREEK ECOLOGICAL STUDY

ANNUAL REPORT

Fiscal Year - 1950

During fiscal year 1950 the advisory committee of the ecological study, consisting of Robert N. Clark, T. F. Hall, Elmer Higgins, J. Z. Holland, F. W. Kittrell, Edward McCrady, P. B. Stockdale, Forrest Western, and A. H. Wiebe, met twice to decide upon the basic aims and purposes of the study, and the general type of administrative organization to be established. The principal purpose of the study was expressed as follows:

"What radioactive elements have accumulated in living things in the stream; where have they accumulated; and what has been the effect on survival rates, population balances, and types of organisms?"

It was agreed that for the time being, the study would be organized into three biological sections consisting of fish population biology, botany, and limnology, each under the direction of a section leader with auxiliary sections to provide for hydrological, surveying, and analytical services to be furnished by TVA, and for radiological services to be furnished by ORNL.

The principal activities carried out by TVA during the fiscal year were related to work of the Stream Sanitation Section and the Hydraulic Data Branch, together with those of the sanitary engineer on loan to the ORNL. After considerable effort and some delay, qualified biologists were located and employed. The botanist, fisheries biologist, and limnologist assumed their duties on June 12, 19 and 26, respectively. Organizational duties and observations of the area, together with some few collections of algae, consumed the few remaining days of the fiscal year. Following a review of waste disposal activities, of available reports, and of available reference material, the various sources of wastes affecting White Oak Creek were determined. Thereafter, a field reconnaissance was made of White Oak

Creek and Lake from a point above the sewage discharge from the Jones Construction Company headquarters to White Oak Dam. Particular attention was paid to existing installations for the control or modification of wastes, and to suitable sites for stream gages and sampling stations including the availability and condition of roads for access to necessary points on the creek and lake.

During the preliminary field investigation, samples were collected from Melton Branch to determine the reliability of the widespread impression that this was an acid stream, which, if correct, would be an important factor in the ecology of the stream and in its possible effect on White Oak Lake. The results revealed that the chemical characteristics of Melton Branch are very similar to those of White Oak Creek itself, which are alkaline and normal for a small stream in this area where limestone formations are common.

The investigation of the sedimentation in which radioactive wastes from ORNL are retained before discharge to White Oak Creek revealed several items in which improvements were needed to assure reliable measurement of waste flows and to permit representative sampling. A design was prepared for a structure to collect the five separate basin outlets into a single line equipped with a weir box, weir, and an automatic continuous sampler that proportions the size of the sample to the rate of flow. On the basis of this proposal, together with a preliminary estimate of cost, ORNL agreed to start the action necessary to effect these changes in the sedimentation basin outlet.

Plans were made for the installations and activities necessary to provide hydraulic and physical data on the creek and lake. Throughout the planning phase consideration was given to potential benefits of the hydraulic studies to the ORNL waste disposal program as well as to the needs of the ecological study, and final decisions were made on the basis of joint benefits. Good progress was made by the

Hydraulic Data Branch on this phase of the work before the end of the fiscal year. Stream gages were installed on White Oak Creek above the point of discharge of the sedimentation basin and above White Oak Lake. Stream flow measurements were started to provide rating curves for the two gaging stations and for the White Oak Dam overflow structure. A system of survey reference markers was started along White Oak Lake with concrete monuments to mark parallel transect lines at 400-foot intervals, and with iron pins at intermediate 100-foot intervals. Preliminary attention was given to appropriate methods of determining the time of water travel from the sedimentation basin to White Oak Dam.

A tentative plan for routine water sampling and chemical and physical analysis was prepared but was not put in operation during the year pending orientation of the newly employed biologists, and their decision regarding the type of sampling and analysis that would be most useful in the interpretation of biological data. It was decided that planning for investigations of radioactivity of water and silt deposits, and possible toxicity of water, could not be undertaken intelligently until after careful consideration by the biologists, and that proper definition of these needs might, in fact, be possible only after the analysis of their preliminary findings.

The ORNL, in addition to valuable service with the field studies, started investigations relative to appropriate laboratory methods which could be used for counting and radio assay work. Particular thought and study were given to the development of suitable instruments, and to techniques for rapid estimation of radioisotopes in biological tissues. Considerable progress was made in the substitution of volumetric methods for the more cumbersome and time-consuming gravimetric procedures.

4.

The early stages of the project have been marked by a splendid spirit of cooperation. In assisting the TVA, the representatives of the AEC and the ORNL have shown not only great interest, but great energy as well, in getting the project under way. Their constructive counsel and their wholehearted participation are greatly appreciated.

Fiscal Statement

Contract AT(40-1)-221, TV-7699A, was executed on January 19, 1950, to become effective January 1. It provided the work plan for the project, as well as contractual arrangements under which TVA is reimbursed by the AEC. The initial operating budget for fiscal year 1950 was \$34,000, reduced on May 15, 1950, to \$13,000. Expenditures for fiscal year total \$6,847.22, of which \$3,297.40 was obligated by Hydraulic Data Branch of the Division of Water Control Planning, and \$1,510.60 by Fish and Game Branch of the Division of Forestry Relations. The balance, \$2,039.22, was obligated by the Division of Health and Safety principally for clerical and stenographic services required by the Chief of the Public Health Engineering Branch in support of ecological investigations.