DOE/OR/22002--T2

AN IDENTIFICATION OF THE EAST FORK POPLAR CREEK FLOODPLAIN
ANDERSON AND ROANE COUNTIES, TENNESSEE

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By E. D. Wilson Date Jan 12, 98

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AN IDENTIFICATION OF THE EAST FORK POPLAR CREEK FLOODPLAIN
ANDERSON AND ROANE COUNTIES, TENNESSEE

SECTION 1 - INTRODUCTION

1.1 Authority. The work in this report was conducted by the U.S. Army Corps of Engineers, Nashville District, during the period November 1991 through July 1992 for the U.S. Department of Energy (DOE). The study was performed under Interagency Agreement No. DE-A105-91OR22002 - East Fork Poplar Creek Environmental Restoration Activities, dated 16 August 1991.

1.2 Purpose and Scope.

1.2.1 Purpose. The purpose of this study is to identify the East Fork Poplar Creek (EFPC) floodplain. This information is required as part of the remedial action plans for removal or containment of contamination within the EFPC floodplain. EFPC and a portion of its floodplain have been contaminated as a result of operations and accidental releases at the Department of Energy's Y-12 Plant. Mercury is the major contaminant found in EFPC and its floodplain. DOE regulation 10 CFR 1022, which implements Executive order 11988 (Floodplain Management), requires the identification of floodplains along EFPC. As part of the development of remediation plans, DOE requested the Nashville District determine and delineate various floodplains for EFPC.

1.2.2 Initial Scope. The Interagency Agreement between DOE and the Corps initially called for a detailed hydrologic and hydraulic analysis of the EFPC basin. This analysis was to be used to provide the data needed to delineate various floodplain boundaries for EFPC from the mouth to mile 14.02 on maps provided by DOE. The specific floodplain boundaries to be delineated were the 100-year, 500-year, Flood of Record, and Probable Maximum Flood (PMF). Mapping of these boundaries was to involve placing the data in Computer Aided Drafting and Design (CADD) files suitable for future use by DOE.

1.2.3 Additions to Scope. Mr. David Page of DOE contacted the Corps in January 1992 and requested an advance assessment of floodplain conditions at the Oak Ridge Girls Club (Jefferson Tennis Courts) property located on EFPC. Since this property lies within the City of Oak Ridge and the city participates in the National Flood Insurance Program, it has adopted local ordinances which prohibit fill in the floodway of EFPC. The adoption and enforcement of these ordinances is a requirement of all participants in this program. In keeping with these requirements, Mr. Page requested that the Corps add to its scope of work the delineation of the floodway boundary for EFPC at all areas covered by the National Flood Insurance Program. Mr. Page

SECTION 2 - STUDY AREA DESCRIPTION

2.1 General. East Fork Poplar Creek (EFPC) is located in Anderson and Roane counties of Eastern Tennessee approximately 20 miles northwest of Knoxville, Tennessee. EFPC has its origin on Chestnut Ridge, which is adjacent to the DOE Y-12 Plant and south of the residential area of Oak Ridge. The creek flows generally northwesterly into Oak Ridge and parallels State Route 62 in this reach. Near the intersection of State Routes 95 and 62, it is joined by Bear Creek, a major tributary that drains the Y-12 Plant and Oak Ridge Reservation. From here, the main stream flows approximately 12.5 miles southwest to enter Poplar Creek about 5.5 miles above its confluence with Watts Bar Reservoir backwater (Reference 1 and 2).

2.2 Basin Description. The entire drainage area is rectangular in shape and extends about 9 miles southwest by northeast and 3.5 miles northwest by southeast. The basin is separated into two major drainage areas by East Fork Ridge. The larger portion of the basin extends from the mouth northeast into Oak Ridge which encompasses approximately three-fourths of the 29.8 square mile total drainage. The smaller portion is the Bear Creek basin which drains into EFPC from its left bank at mile 1.47 and extends northeast, paralleling the main drainage basin of EFPC (Reference 1 and 2).

2.3 Principal Flood Problems. Knowledge of major floods on EFPC extends back to 1928 based on stream gage records for the period 1961 to 1981, old newspaper reports, and interviews with longtime residents. Major floods occurred on June 29, 1928, September 29, 1944, November 28, 1973, and April 4, 1977. The November 28, 1973 and April 4, 1977 floods were about equal in magnitude on EFPC. These floods reached an elevation of 770.2 feet NGVD with an average recurrence interval of approximately 30 years at the U.S. Geological Survey (USGS) gage at mile 3.3.

SECTION 3 - ENGINEERING METHODS

3.1 Hydrologic Analyses. At an Interagency meeting held on January 24, 1992, representatives from the Nashville District Corps, DOE, and TVA agreed that TVA's previous flood analysis of EFPC would be used to delineate the boundaries for the 100-year and 500-year floodplains and that no further flood analyses by the Corps was needed. This reduced the Corps role for the floodplain investigations to the delineation and layout of the above floodplains on digital based mapping. Copies of the TVA report were received from Mr. Ed Daughtery of Martin Marietta Energy Systems and HEC-2 computer input files were received from Mr. Charles Scarbrough of TVA. To map the floodway, a copy of the HEC-2 input data for the EFPC floodway, as it is presented in the Oak Ridge Flood Insurance Study, dated November 1984, was also acquired from Mr. Scarbrough.

of Energy Y-12, ORNL, and K-25 Plants. The 100-year and 500-year flood boundaries were determined for the reach from the mouth to stream mile 14.02.

3.4.3 All boundaries for the 100-year flood, 500-year flood, and floodway were first drawn on work maps and then digitized using the Microstation CADD system. This was then stored as digital data on magnetic media for future reference. In addition to the floodplain boundaries, the location of wetlands and cultural resource areas were also digitized in this manner. There are separate digital design files for each of these areas of interest. All files are referenced to the original design files of the mapping provided by DOE.

3.4.4 A final set of maps were plotted at a scale of 1 inch equals 100 feet. A legend is provided on each map sheet and an additional index sheet is provided showing the location of each sheet in relation to the other sheets in the set.

Section 4 - Summary.

4.1 Oak Ridge Girls Club. As previously stated, an advance assessment of wetlands, cultural resources, and floodplain conditions was requested for the Oak Ridge Girls Club property. A report on this assessment was supplied in May 1992 as a separate document from the remaining study area.

4.2 Recommendations. We again emphasize that the portion of the study area of EFPC lying within the limits of the City of Oak Ridge Flood Insurance Study is subject to local ordinances governing placement of fill in the floodway. Nashville District personnel contacted the Federal Emergency Management Agency (FEMA) in regard to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) response actions. Mrs. Mary Ann Lyle, Chief Region IV, Risk Assessment Section, FEMA, indicated that it is FEMA's opinion that CERCLA response actions must comply with these ordinances. We recommend that a written clarification of this opinion be obtained from FEMA before any remedial action alternatives requiring fill in the EFPC floodway be considered.

Section 5 - References.

1 Tennessee Valley Authority, Division of Water Control Planning, Floods on Clinch River and East Fork Poplar Creek in the Vicinity of Oak Ridge, Tennessee, Knoxville, Tennessee, Report No. 0-5922, September 1959.

2 Tennessee Valley Authority, Division of Water Control Planning, Type 19 Flood Insurance Study, City of Oak Ridge, Anderson and Roane Counties, Tennessee, Knoxville, Tennessee, 1984.

EAST FOR

POPLAR CREEK

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100-year Flood, 500-year Flood, and
Floodway Boundaries
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EAST FORK

LEGEND

500-year Flood Boundary
100-year Flood Boundary
Floodway

100' 0 100'

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LEGEND

500-year Flood Boundary
100-year Flood Boundary
Floodway

100' 0 100'

EAST FORK

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EAST FORK

LEGEND

- 500-year Flood Boundary
- 100-year Flood Boundary
- /// Floodway

100' 0 100'

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LEGEND

500-year Flood Boundary
100-year Flood Boundary
Floodway

100' 0 100'

POPLAR CREEK

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LEGEND

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- 100-year Flood Boundary
- Floodway

100' 0 100'

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EAST FORK

LEGEND

500-year Flood Boundary
100-year Flood Boundary
Floodway

100' 0 100'

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LEGEND

- 500-year Flood Boundary
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- Floodway

100' 0 100'

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LEGEND

500-year Flood Boundary
100-year Flood Boundary
Floodway

100' 0 100'

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EAST FORK

LEGEND

500-year Flood Boundary
100-year Flood Boundary
Floodway

100' 0 100'

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LEGEND

500-year Flood Boundary
100-year Flood Boundary
Floodway

100' 0 100'

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EAST FORK I

LEGEND

500-year Flood Boundary
100-year Flood Boundary
Floodway

100' 0 100'

EAST FORK I

LEGEND

500-year Flood Boundary
100-year Flood Boundary
Floodway

100' 0 100'

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EAST FORK

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EAST FORK

LEGEND

500-year Flood Boundary
100-year Flood Boundary
Floodway

100' 0 100'

EAST FORK

LEGEND

500-year Flood Boundary
100-year Flood Boundary
Floodway

100' 0 100'

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LEGEND

500-year Flood Boundary
100-year Flood Boundary
Floodway

100' 0 100'