COGLEY RUN

MINE DRAINAGE POLLUTION

ABATEMENT PROJECT

OPERATION SCARLIFT

COMMONWEALTH OF PENNSYLVANIA

MILTON J. SHAPP, GOVERNOR

DEPT. OF ENVIRONMENTAL RESOURCES

MAURICE K. GODDARD, SECRETARY

STUDY RESULTS

STUDY RESULTS

STREAM QUALITY

Water analysis of samples collected from May 4, 1970, through December 5, 1972, indicate that the entire reaches of Cogley Run is degraded by acid mine drainage. The pH in the upper reaches of the stream averages 3.62 and has an average acid concentration of about 46 mg/l.

The pH at the mouth of Cogley Run averages 3.42 with an average acid concentration of 110.75 mg/l. Cogley Run delivers approximately 7.800 lbs. of acid per day to East Sandy Creek. The effect of Cogley Run upon East Sandy Creek can be illustrated by sampling results obtained from points above and below the mouth of Cogley Run. On East Sandy Creek upstream from the mouth of Cogley Run, the pH averages 6.36 with an average acid concentration of 4 mg/l. Downstream from the mouth of Cogley Run the average acid concentration in East Sandy Creek is 13.25 mg/l with an average pH of 4.82.

There are no known active mining or mine drainage permits in existence within the watershed. The public use of Cogley Run is essentially negligible and no aquatic life was in evidence during the course of the study.

As Cogley Run degrades the quality of East Sandy Creek, much of which is comprised of a series of pools and riffles, its recreational potential as a game fishery is seriously reduced. The Cogley Run Watershed and East Sandy Creek, has excellent potential for providing an outdoor recreation setting to augment those of the nearby State Game Lands No. 45 and Camp Coffman, the area Boy Scout Camp.

SAMPLING AND MEASURING RESULTS

Sampling and flow measurements were taken at sixteen (16) stream and

pollution sources. The locations of these sampling stations are shown on the sampling station location drawing. The sampling results are shown on the Exhibits entitled,, "Sampling Data". The data provided are all the sampling results compiled during the course of the study.

The Sulfate Materials Balance

The sulfate ion is present in coal mine drainage in Pennsylvania without exception, and has concentrations in the range of 300 mg/l to 10,000 mg/l. The sulfate concentration from an abandoned deep mine located 3.2 miles upstream from the mouth of Cogley Run (W14) averages 6500 mg/l. The discharges are acidic with an average pH of 2.63. Another abandoned deep mine located 3.5 miles upstream from the mouth of Cogley Run (W16) averages 382.5 mg/l with an average pH of 3.4. A third abandoned deep mine located 3.6 miles upstream from the mouth of Cogley Run (W15) averages 56.5 mg/l with an average pH of 4.1. All high acid discharges would be expected to have sulfates in the concentration ranges noted above for the first two deep mine discharges.

The sulfate ion will not significantly degrade or precipitate from solution, particularly at the relatively stable pH conditions found in natural waters. This allows the use of the ion as an indicator to account for total pollution inputs to a surface stream. Accordingly, a sulfate material balance was prepared and shown in the exhibit entitled, "Sulfate Distribution Map."

SULFATE DISTRIBUTION MAP
COGLEY RUN WATERSHED
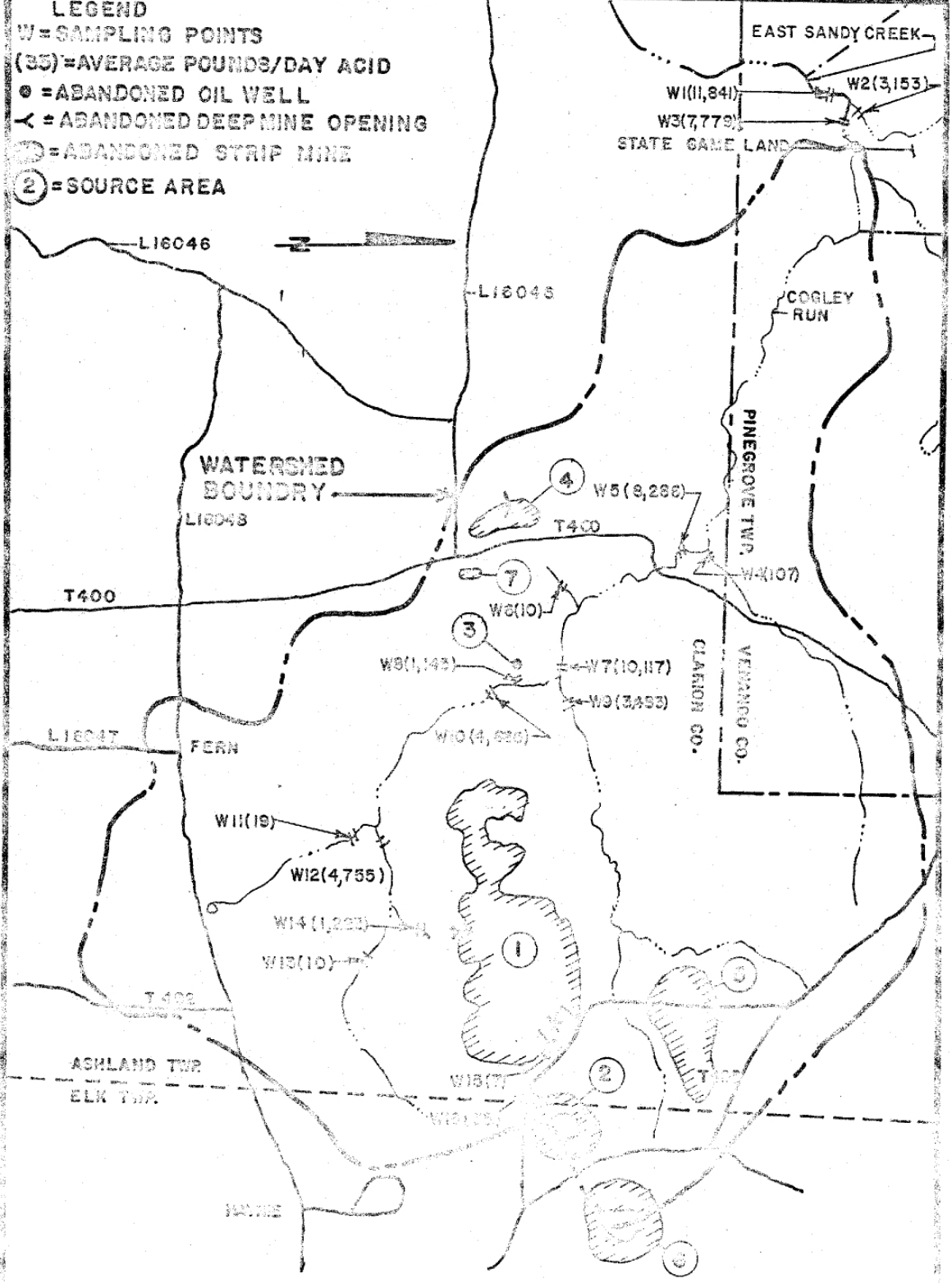CLARION AND VENANGO COUNTIES
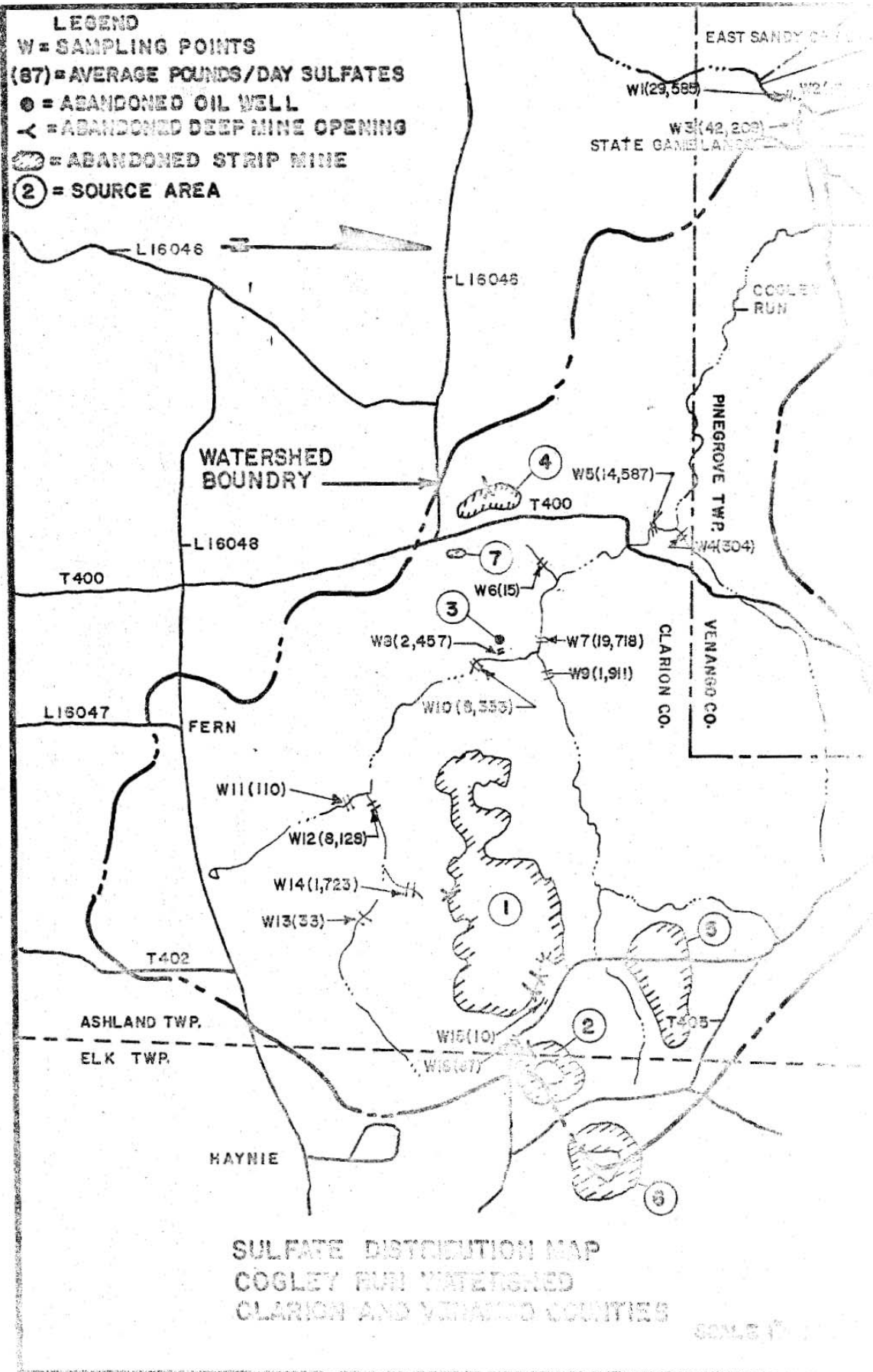
Acid Load Distribution

The following exhibit shows the distribution of "average" acid loads throughout the watershed. It is not possible to show a percentage distribution for the acid, since it is really somewhat of a fallacy to show even "average" acid loading. This data is based on all samples taken over the course of the study, and do not reflect the "slugging" effects of trapped pools released by heavy rainfall or the other varying conditions that affect acid loadings.

However, the exhibit is useful as visual guide to the geographical areas within the watershed that are usually responsible for most of the high acid loads.

Other Load Distributions

The following exhibits are shown as a visual aid to the geographic areas, particularly the sampling points or weir locations, within the watershed that are responsible for loadings of ferrous iron and total iron. The purpose of these exhibits is to show the overall effect of the above elements to the degradation of Cogley Run Watershed.
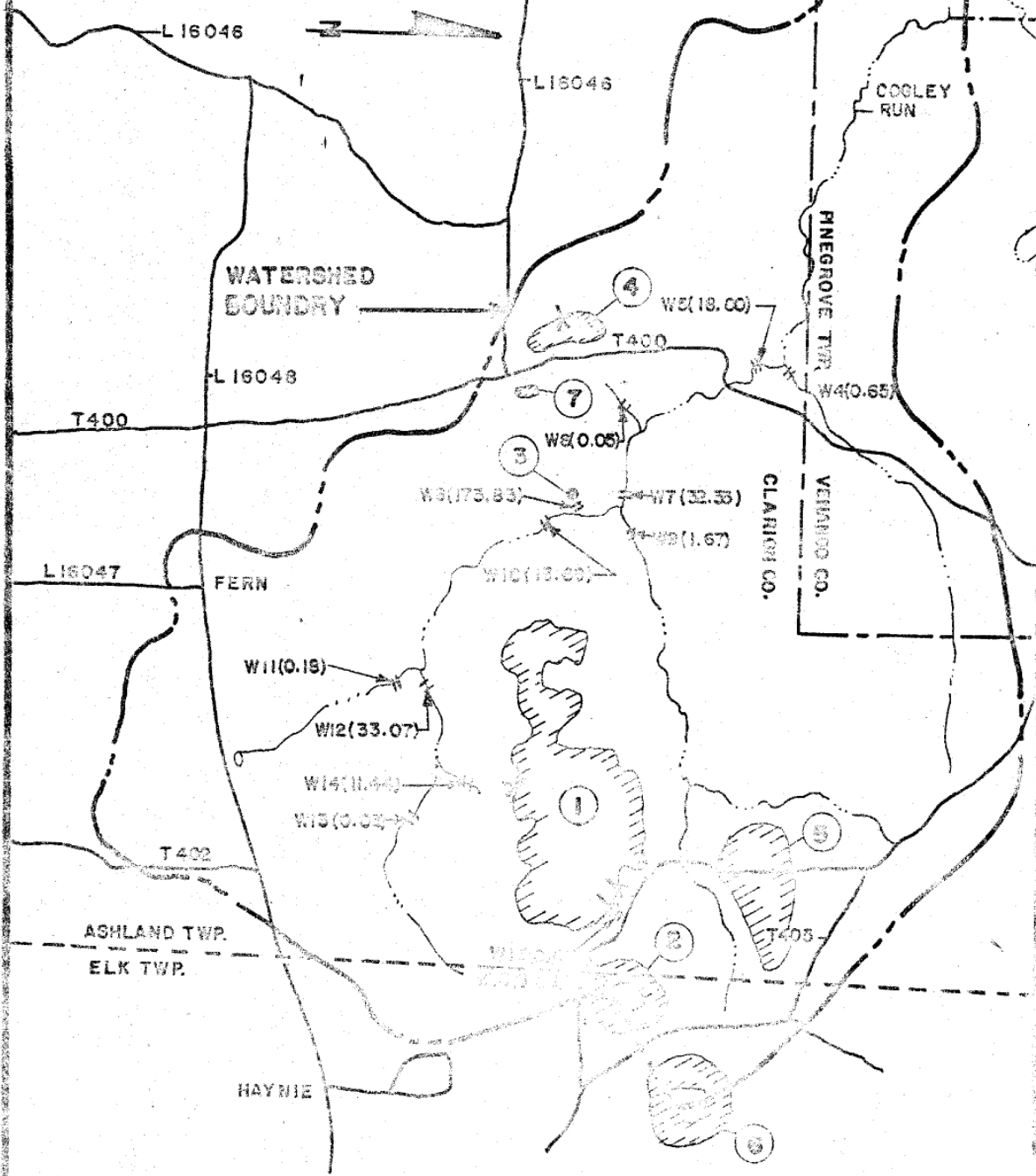
EAST SANDY CREEK

W1(11,841)   W2(3,153)
W3(7,779)
STATE GAME LAND

COGLEY RUN

L16046
L16046

WATERSHED BOUNDRY

④ W5(8,286)
T400

⑦
W6(10)

③
W8(1,143)   ≺ W7(10,117)
W9(3,853)
W10(4,680)

W11(19)

W12(4,755)

W14(1,223)
W13(10)

①

⑤

L16047   FERN

T400

T400

ASHLAND TWP
ELK TWP.

W15(7)

②

②

⑥

PINEGROVE TWP.
VENANGO CO.
CLARION CO.
W4(107)

. ACID DISTRIBUTION MAP
COGLEY RUN WATERSHED
CLARION AND VENANGO COUNTIES

24

FERROUS IRON DISTRIBUTION MAP
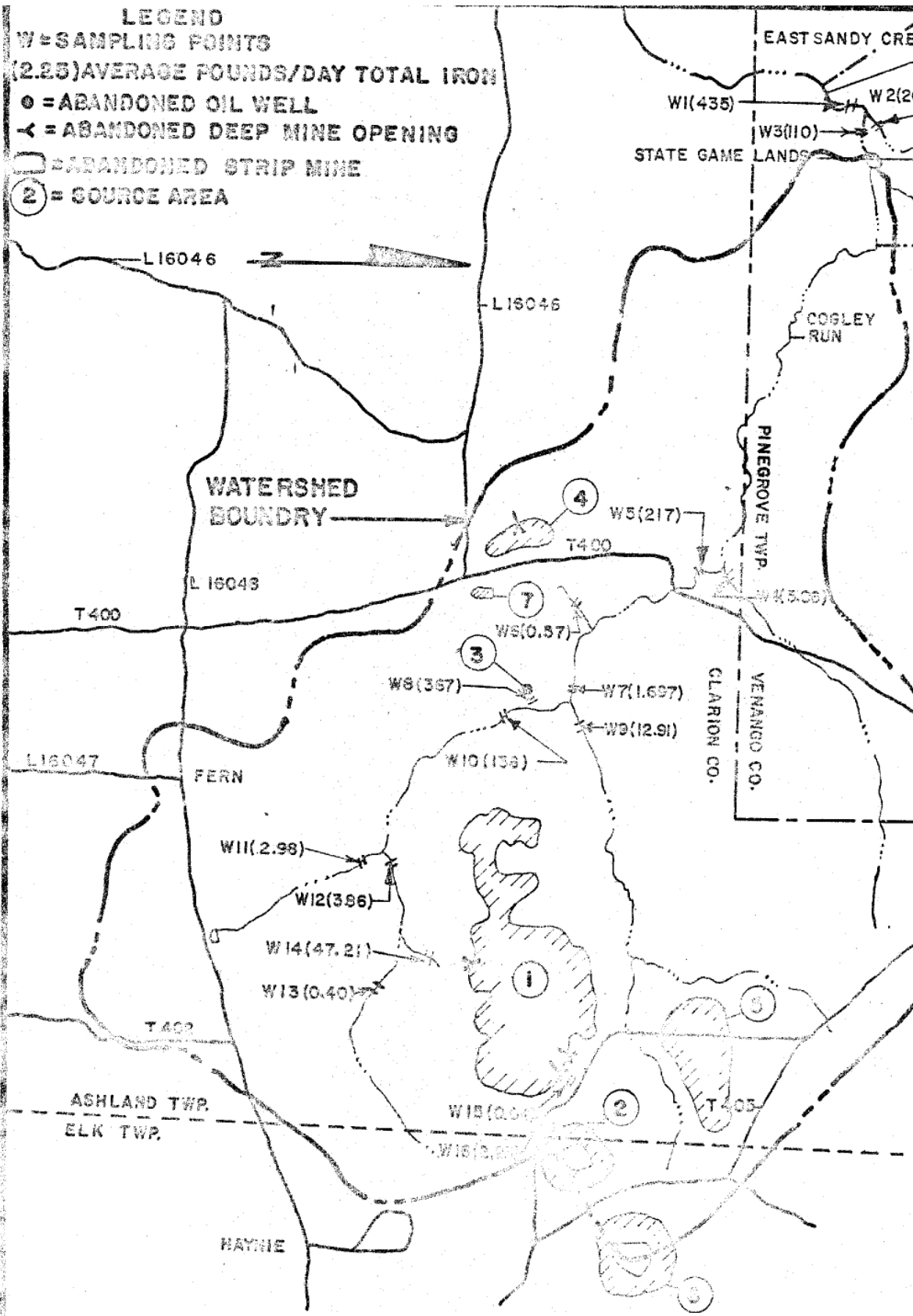COOLEY RUN WATERSHED
CLARION AND VENANGO COUNTIES

SCALE 1" = 1000'

LEGEND
W = SAMPLING POINTS
(2.25) AVERAGE POUNDS/DAY TOTAL IRON
● = ABANDONED OIL WELL
◄ = ABANDONED DEEP MINE OPENING
▭ = ABANDONED STRIP MINE
② = SOURCE AREA

L 16046

L 16046

EAST SANDY CREEK

W1(435)
W2(20...)
W3(110)
STATE GAME LANDS

COGLEY RUN

PINEGROVE TWP.

WATERSHED
BOUNDRY

L 16043

T 400

④ W5(217)
T 400

⑦
W8(0.87)

③
W6(367)
W7(1.697)
W9(12.91)
W10(136)

W4(5.08)

CLARION CO.

VENANGO CO.

L 16047

FERN

W11(2.98)

W12(386)

W14(47.21)

W13(0.40)

T 402

ASHLAND TWP.
ELK TWP.

W15(0.0...)
W16(...)

①

②

T 405

HAYNIE

TOTAL IRON DISTRIBUTION MAP
COGLEY RUN WATERSHED
CLARION AND VENANGO COUNTIES

26