STUDY RESULTS

STREAM QUALITY

The analyses of stream samples collected during the year's sampling survey (July 1969 through June 1970) indicate that the main stem of Alder Run and all of its tributaries, with two exceptions, are severely polluted by mine drainage. The pH of these streams varied from a minimum of 2.2 to a maximum of 6.0. Minimum and maximum concentrations of net alkalinity or acidity were 10 mg/L alkalinity to 2100 mg/L acidity, and total iron ranged from 0.1 mg/L to 500 mg/L. Only Hubler Run and one small unnamed tributary which have apparently not been affected by mining, showed an average pH above five. These two streams were essentially neutral from an alkalinity-acidity standpoint. Hubler Run supports fish life including native brown trout.

The average daily pollution loads contributed by each major stream on the watershed are shown below:

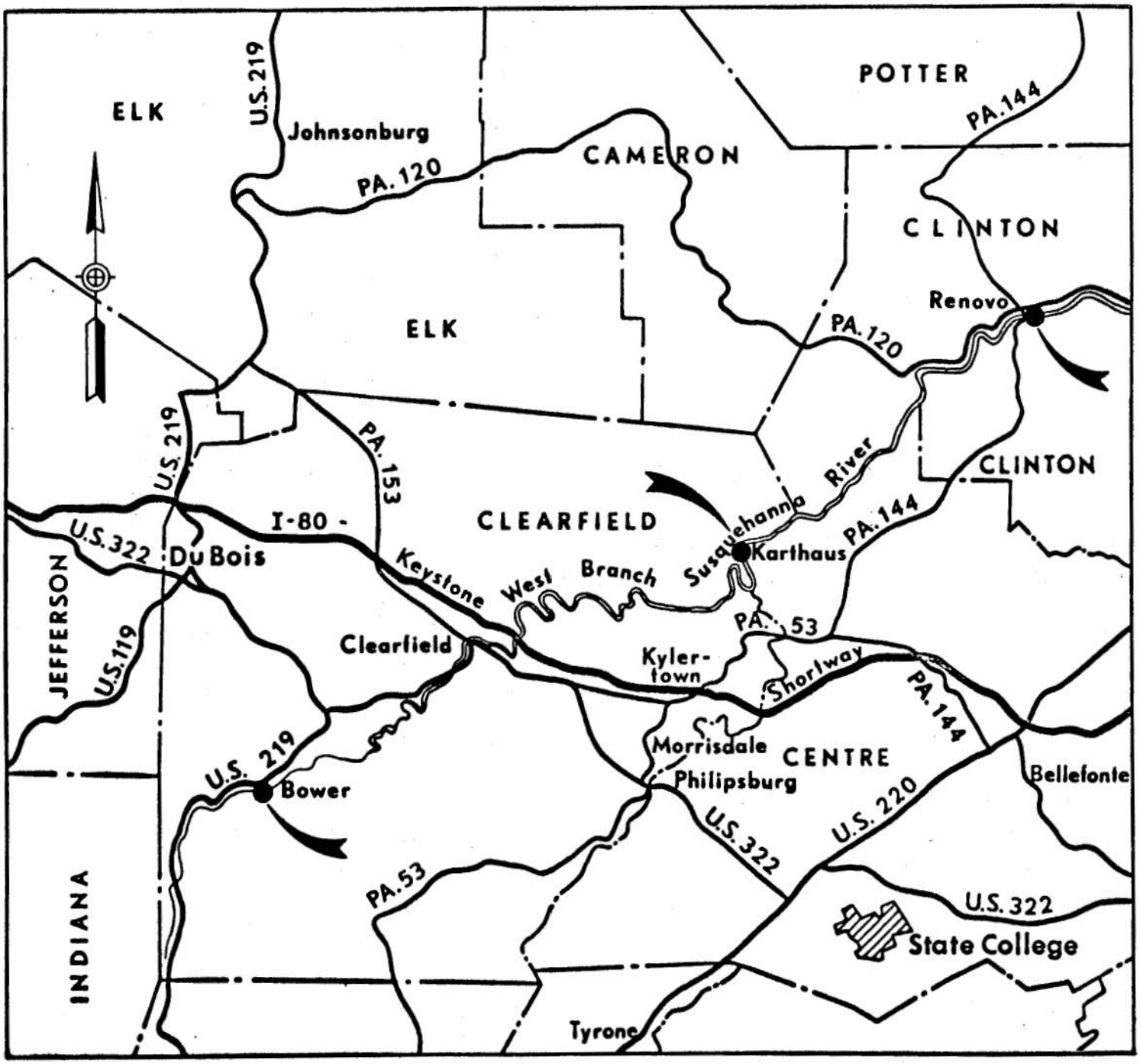
Sub-Basin	ACID		IRON		SULFATE	
	Pounds Total	Pounds Per Acre *	Pounds Total	Pounds Per Acre *	Pounds Total	Pounds Per Acre*
Flat Run	478	0.4	7.5	0.01	1,429	1.2
Mons Run	3,135	2.5	127	0.10	6,531	5.3
Browns Run	9,185	2.3	704	0.18	20,996	5.3
Alder Run	16,470	1.8	791	0.09	37,104	4.1

* Acres of Total Watershed

These analyses indicate the acid pollution load contributed by Alder Run to the West Branch averaged 16,470 #/day during the survey year (July 1969-June 1970) with a maximum and minimum of 65,219 #/day and 3,381 #/day, respectively.

The average acid loading from Alder Run was compared with the acid load in the West Branch at the confluence of Alder Run. The only reasonable accurate quality measuring location is at Karthaus on the West Branch, about 10 miles downstream. However, this station's quality readings included the acid input from highly polluted Moshannon Creek. In order to subtract the effect of Moshannon Creek from the Karthaus readings, the magnitude of acid pollution at the mouth of Moshannon Creek was estimated. The Department of Health's Network Sampling Station was 40 miles upstream from the mouth of Moshannon Creek. By comparing this station's average acid load (based on 30 analyses and flow measurements over eight years) with that reported by the FWQA's Susquehanna study report for the same location, (based on only several analyses), it appeared the FWQA quality measurements were low by 22% (29,800 pounds acid per day compared to the Network Station's figure of 36,156). I t was then assumed the FWQA figure of 130,000 pounds acid per day at Moshannon Creek's mouth was also low by 22%. The correction resulted in an average acid load from the Moshannon Creek watershed of 157,600 #/day. The average acid load at Karthaus on the West Branch is 365,100 pounds per day, based on 29 readings within an eight year period. The acid load in the West Branch after its confluence with Alder Run, is, therefore, 207,500 pounds per day. Alder Run contributes an average of 16,470 pounds

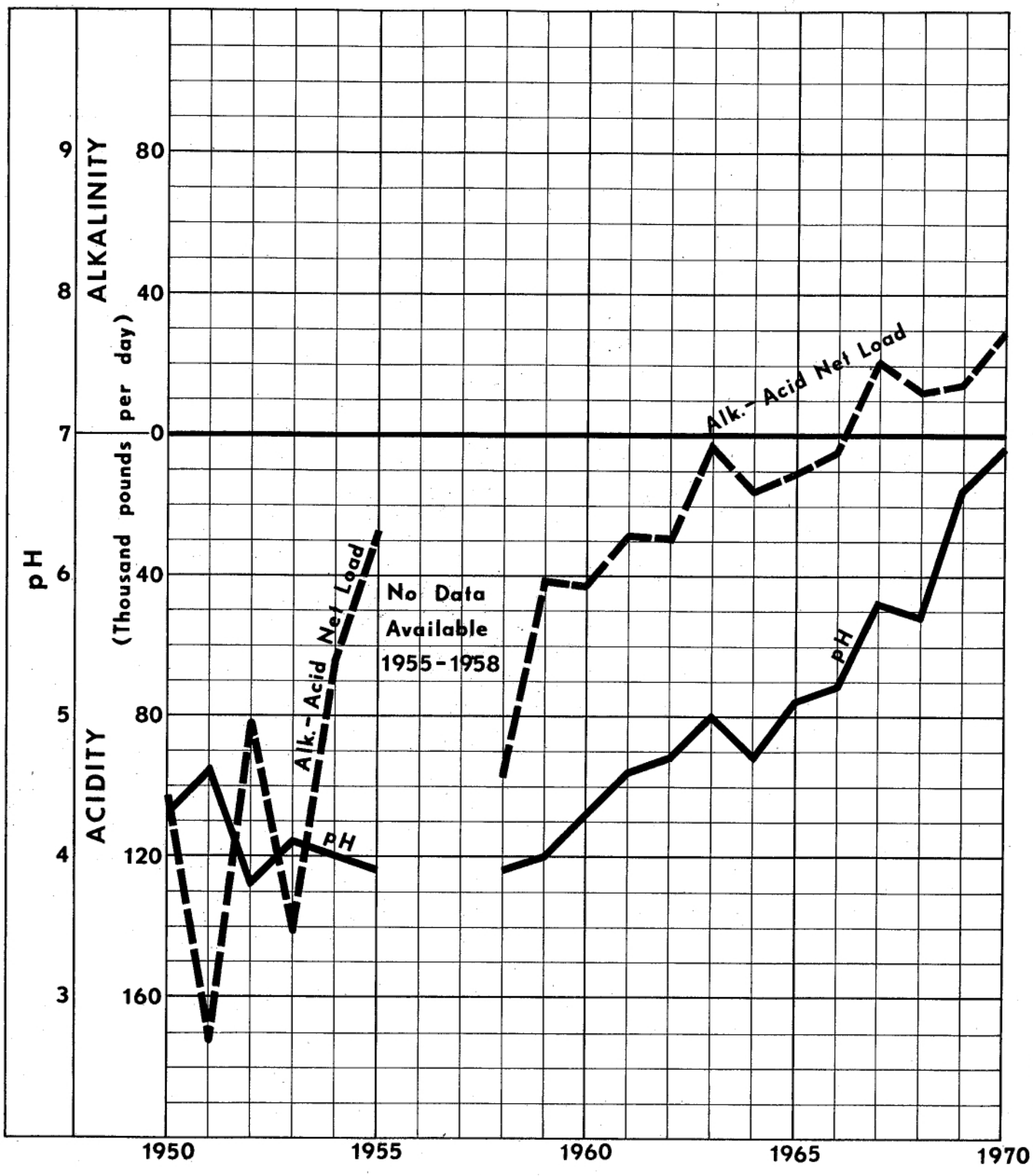
SUSQ. WATER QUALITY



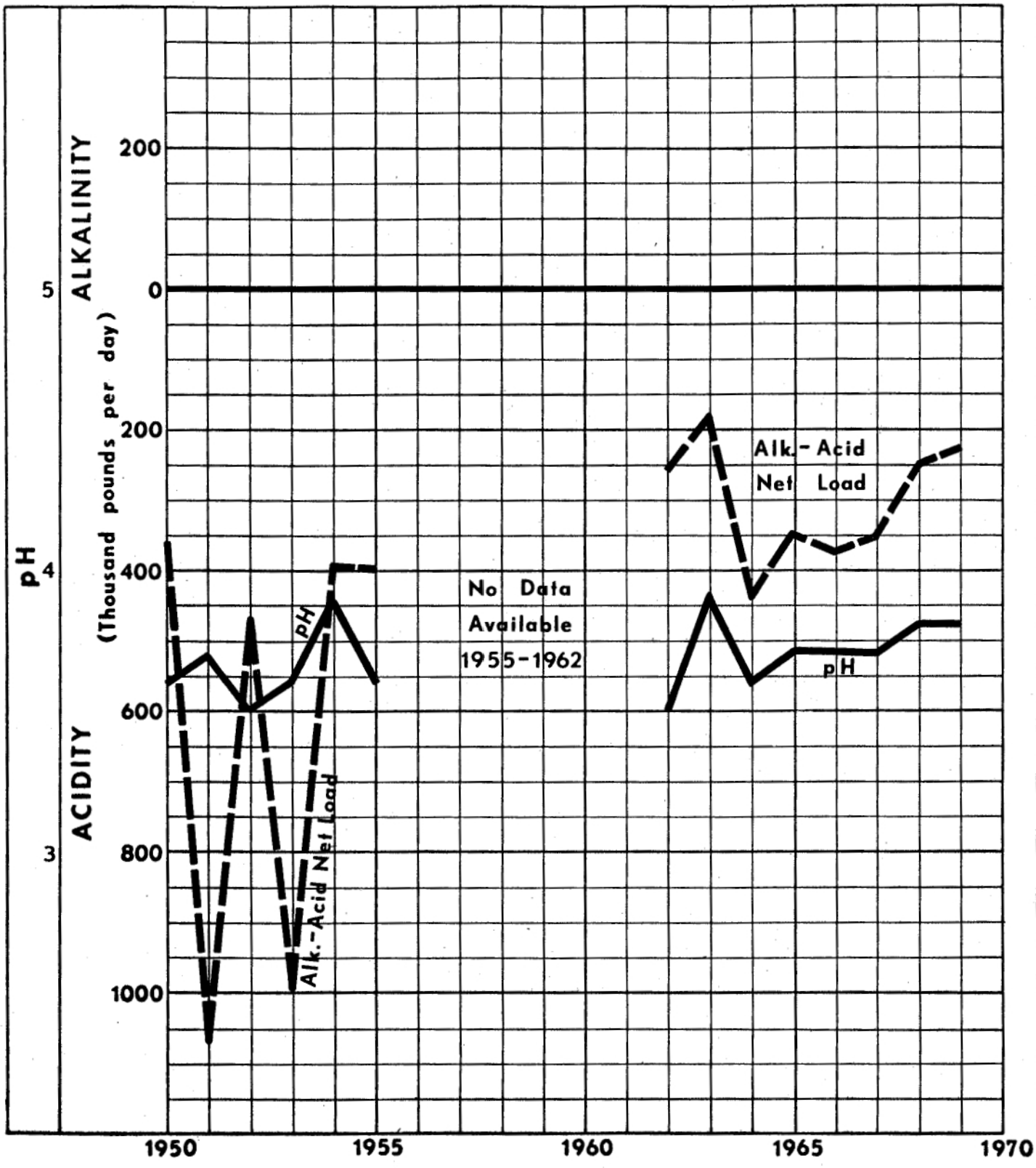
LOCATION MAP

9 6 3 0 9

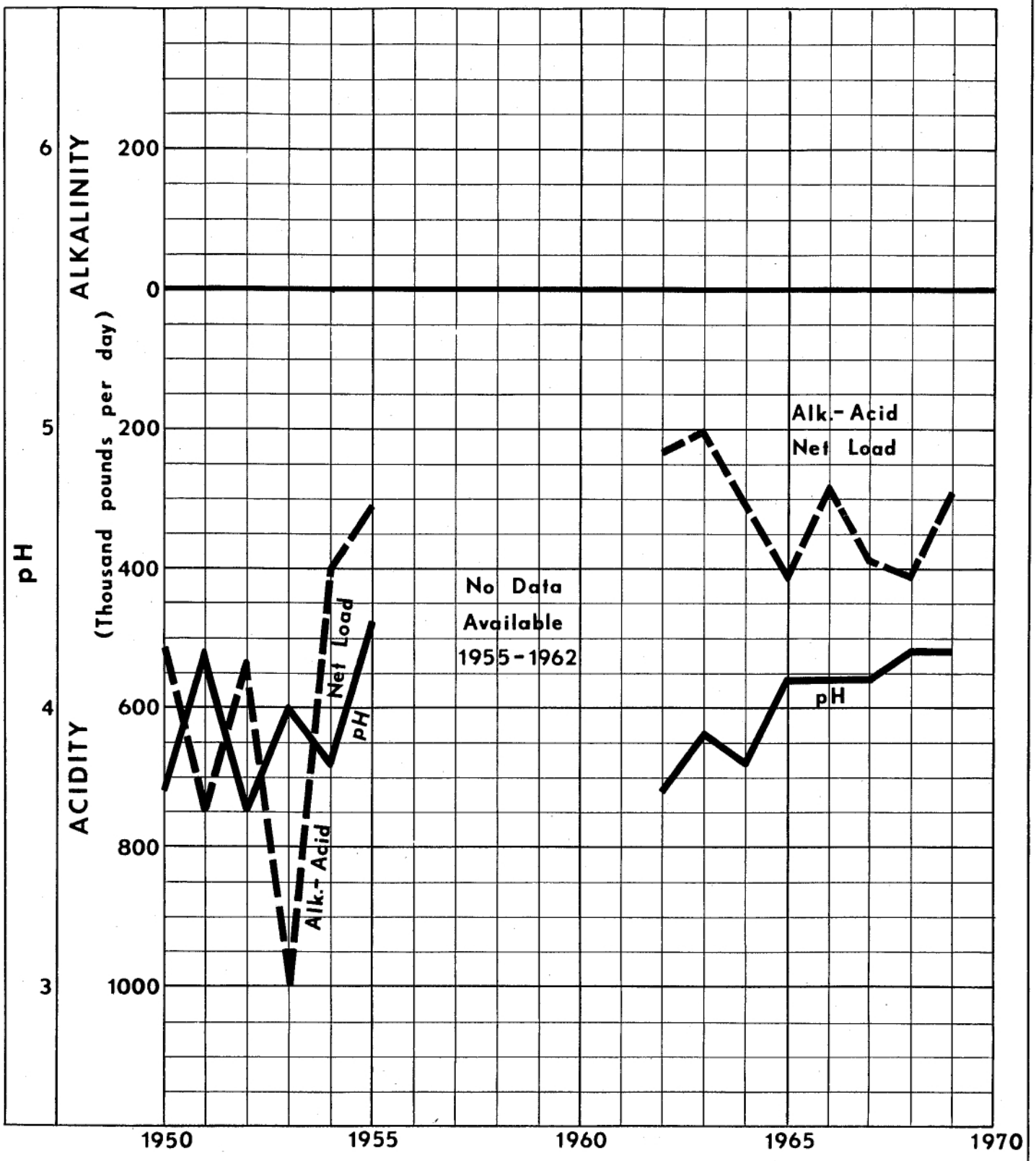
Scale in Miles



WATER QUALITY
West Branch Susquehanna River
Bower - Clearfield County



WATER QUALITY
West Branch Susquehanna River
Karthaus - Clearfield County



WATER QUALITY

West Branch Susquehanna River

Renovo - Clinton County

acid per day, or 8% of the load in the West Branch upstream from its confluence with Moshannon Creek .

The importance of reducing pollution loads from all acid tributaries of the West Branch is emphasized by one of the most exciting occurrences in the history of Pennsylvania's water pollution control efforts the recovery of the West Branch Susquehanna River from its headwaters to the confluence of Clearfield Creek, a distance of over 70 miles. The local Waterways Patrolman for the Fish Commission has indicated that in the recent few years sport fishing in this area has improved tremendously. This improvement in water quality, and thus fish catches, is corroborated by stream biota studies conducted by Fish Commission biologists, and by water quality sampling conducted by the Commission and State Health Department. The Department's water quality network sampling station at Bower (about midway within the improved stretch of river) indicates that a rapid improvement to the river occurred late in 1966 and during 1967. The last six quarterly sampling runs all showed the pH to exceed 6.0 and to average almost 6.6. The last eight years of data which documents this recovery in water quality is shown by the preceding graphs.

A further encouraging aspect to this recovery is that the Waterways Patrolman reports that catfish and some bass are now being caught by fishermen in the West Branch below its confluence with Clearfield Creek. This would indicate that the portion of the river between Clearfield Creek and Moshannon Creek (a distance of over 30 river miles) may be improving in quality. Alder Run enters the river in this stretch. If

the acid loads from Alder Run and other tributaries in this stretch of river can be reduced, there is an excellent chance that 30 miles of this large river can recover to the point where it will support a game fishery..

The Waterways Patrolman has indicated a real need for additional fishing waters in this area of the State. At the present time, persons interested in fishing in the Clearfield County area are essentially limited to Black Moshannon Creek and Mosquito Creek. If fishing (and other forms of recreation) could be established in 30 miles of a river the size of the West Branch as well as in portions of reclaimed tributaries, it would considerably benefit the area.

The Alder Run stream analyses indicate the quality of Alder Run has apparently not significantly changed since the early 1950's. It should be recognized in drawing such a conclusion, that the samples collected and analyzed prior to this study were widely spaced and not related to stream flows, so at best, they are merely qualitative indicators (A table of these sample analyses is shown opposite).

A discouraging revelation of the study was the complete absence of alkaline streams on the entire Alder Run watershed. Also, the geologic configuration of the watershed is such that natural sources of alkalinity are practically nonexistent. These two important factors will seriously retard the restoration of stream quality in Alder Run after completion of abatement measures, unless artificial sources of alkalinity are introduced. This matter is discussed later in this report under "Mine Drainage Treatment".

WATER QUALITY ALDER RUN

1949 - 1961

Station No.*	Date	pH	Acidity
11	6- 9-49	3.9	174
11	3-13-50	3.7	62
11	11-27-51	3.6	260
11	4- 8-53	3.6	52
11	2-24-55	3.5	46
11	3-14-56	3.9	56
11	7-22-57	3.5	178
11	4- 1-59	3.8	76
11	4- 8-59	3.6	74
11	8-25-59	3.3	180
11	1-11-60	4.3	6
11	6- 7-60	3.6	84
11	6- 6-61	3.6	140
11	6- 6-61	3.6	160
11	10-24-61	3.9	166
13	3- 8-54	3.6	80
13	10-29-56	3.8	64
16	3- 8-54	3.5	130
16	1-11-60	3.6	100
18	6- 9-49	3.9	20
23	1- 4-50	3.6	84
23	3-13-50	3.8	70
23	8- 7-57	3.6	30
23	12- 7-60	3.1	250
25	6- 9-49	4.1	56
25	1- 4-50	3.7	74
25	3-13-50	3.9	58
25	2-24-55	3.6	52
25	7-22-57	3.0	290
25	8- 7-57	3.0	190

Station No.*	Date	pH	Acidity
25	5-13-59	3.6	80
25	6- 7-60	3.4	90
25	12- 7-60	3.8	28
25	10-24-61	3.2	400
25	8-10-61	3.2	190
28	4-28-58	2.6	840
49	11-16-55	3.5	94
50	6- 9-49	3.9	90
51	11-16-55	3.5	84
51	4- 8-59	3.6	60
51	5-13-59	3.1	170
51	4- 3-61	3.6	96
56	11- 2-49	3.9	600
56	4- 8-59	3.7	46

*Indicates closest Sampling Station to actual location.