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PROMPTON LAKE PROJECT WATER QUALITY DATA REPORT (RCS-DAEN-CWE-1--ETC(U)
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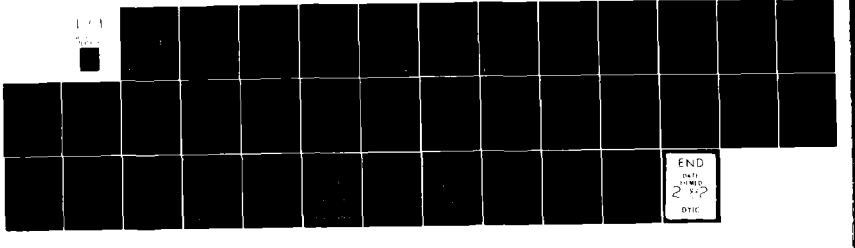

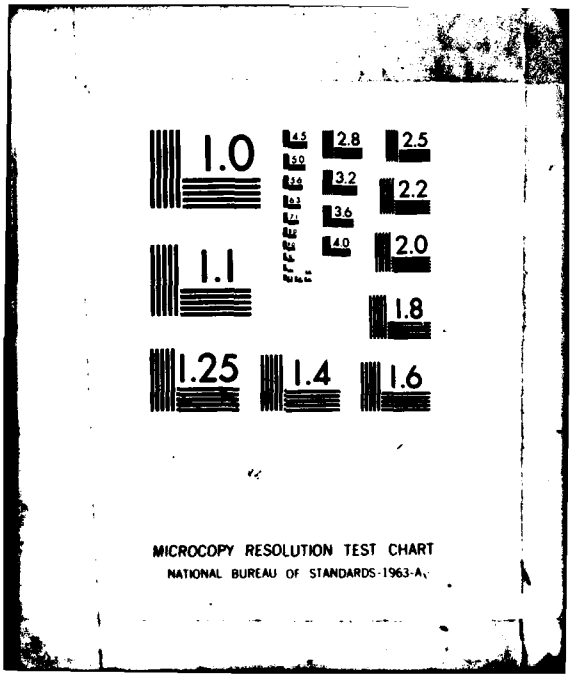
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PROMPTON LAKE PROJECT

WATER QUALITY DATA REPORT (RCS DAEN-CWE-15)

Prepared by

U. S. Army Corps of Engineers
Philadelphia District

FOR THE PERIOD

OCTOBER 1, 1980 TO SEPTEMBER 30, 1981

REPORT NO: DAEN/NAP - 14620/WQDR81 - 81/12

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Prompton Lake, located on the Lackawaxen River within the limits of the Borough of Prompton in Wayne County has been in operation since 1960. The primary purpose of the project are flood control, emergency water supply storage and recreation. This report deals with the water quality aspect of the project. The data presented within this report meets the standards established by the U.S. Environmental Protection Agency and the State of Pennsylvania (DER). The report characterizes the general

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drainage areas as to land use, potential pollution sources contributing to the lake, and the relationship between potential water quality problems that may occur and the possible effects of the lake on water quality.

The water quality seems to be improving based on the nitrogen and phosphate levels. The lake stratifies during late summer but severe storms break stratification and reoxygenate the hypolimnion. The bacterial levels remain within the limits established by the regulatory agencies and indicate no pollution from point sources above the dam.

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SECTION I - SUMMARY AND CONCLUSIONS

1-01. Summary. Prompton Lake, located on the Lackawaxen River within the limits of the Borough of Prompton in Wayne County (Plate 1), has been in operation since July 1960. The primary purposes of the project are flood control, emergency water supply storage and recreation. This report deals with the water quality aspect of the project.

The drainage basin above Prompton Lake consists of woodland and farmland interspersed with recreational areas throughout. Stream valleys, within the watershed have steep side slopes and are mostly wooded with open fields and natural flood plains of moderate width. Pollution control in the watershed is problematic, due to septic tank overflows, lack of sewage systems and drainage from swamplands in the headwaters. Flushing action of spring and fall rains exhibit increases in ammonia nitrogen and some decrease in pH, during heavy stream flows. However, it is very slight and does not appear to lower the water quality.

Prompton Lake has a wide variety of fish, ranging from bass to game fish such as trout. The majority of fishing is done in the lake, however, waters both upstream and downstream are also under heavy fishing pressures. The lake has been stocked several times since its inception and reproduction is satisfactory, indicating that the water quality is good from the biological standpoint. Fish were stocked during 1981. Total coliform counts are within the allowable limits as prescribed in Pennsylvania's Water Quality Criteria, Chapter 93.

Close monitoring of the following water quality parameters; temperature, pH, Ortho Phosphate, Total Dissolved Solids, Specific Conductance, Ammonia, Nitrate, Nitrites and Total Coliforms will be maintained to assure a continuance of acceptable Pennsylvania (DER) water quality standards and to minimize pollution or algal problems as they may occur.

SECTION II - INTRODUCTION

2-01. Purpose and Scope. The purpose of this report is to present and briefly interpret the water quality data collected to date at Prompton Lake. The analyzed data (Appendix A) meets the standards established by the U. S. Environmental Protection Agency and the State of Pennsylvania as outlined in Chapter 93, Water Quality Criteria.

The report characterizes the general drainage areas as to land use, potential pollution sources contributing to the lake, the project itself and the relationship between potential water quality problems that may occur and possible effects of the lake on the water quality.

2-02. Authority. This report is submitted in accordance with the Corps of Engineers policy as authorized in ER 1110-2-334, "Water Quality Management at Corps Civil Works Facilities," 1 May 1974.

2-03. Background Information. Prompton Lake is located across the Lackawaxen River and about one-half mile north of U. S. Highway 6. (See Plate 1). Prompton Dam, spillway and outlet works were completed on 30 November 1960. The primary purpose of the reservoir is for flood control along the Lackawaxen River, with water quality and recreation as secondary uses. Prompton Reservoir is one of four flood control structures in the Delaware River Basin.

2-04. Pertinent Reference. The following references are pertinent to this report:

a. (ER 1110-2-1402)

b. (ER 1130-2-415)

c. Water Quality Management Report - Contract DACW61-79-D-0013.

SECTION III - AREA & PROJECT DESCRIPTION

3-01. River Basin Characteristics. The Lackawaxen River Basin is located in Wayne County in Northeastern Pennsylvania. The Lackawaxen River drains an area of 588 square miles in the northeast corner of Pennsylvania and flows in a southeasterly direction 49 miles to the town of Lackawaxen where it enters the Delaware River. The three principal tributaries of the Lackawaxen River are: Dyberry Creek, draining 71 square miles and entering the river from the north in Honesdale; Middle Creek, draining 82 square miles and joining the river from the west at Hawley; and Wallenpaupack Creek, draining 227 square miles and entering the river from the southwest a short distance downstream from Hawley. The general topography of the basin is characterized by hills with round tops and steep slopes. The bed of the Lackawaxen River rises from 590 feet at its mouth to 960 feet at the confluence with Dyberry Creek. Stream valleys within the reservoir watersheds have steep side slopes and natural flood plains of moderate widths. The watershed is essentially rural with approximately 60-70% being forested. There are several small rural communities along the Lackawaxen River, none of which has a population over several thousand people. Honesdale, which is the county seat, is located approximately five miles downstream of the Prompton Dam at the confluence of the Lackawaxen River and Dyberry Creek.

3-02. Project Description. The principal features of the project are a dam, a spillway, an outlet works, a service building, and several recreation areas, distributed within approximately 1030 acres of partially forested land. The dam is a rock faced, earth filled structure across the valley of the Lackawaxen River. The top of the dam is at elevation 1226. The spillway is located in the west abutment and is an ungated structure with crest at elevation 1205. The outlet works is a concrete structure which houses components including an intake transition pipe, an intake well, standard use concrete stop logs, emergency use wood stop logs, debris interceptors and grating. The reservoir when filled to the recreation pool level, elevation 1125, is approximately 2 1/2 miles long and 1/6 mile wide at the point of maximum width. The average depth of the reservoir is about 20 feet, and the maximum depth is 39 feet.

The recreational areas are located along the west bank of the reservoir. The sites provide a bathing beach, picnic areas, and a boat launch area. The recreation areas were built by the Army Corps of Engineers. The service building, located on the west embankment, provides garage space for project vehicles, and office space for the dam tender's use.

3-03. Climate. 1/ The Lackawaxen River Basin has a temperate northeast Atlantic Coast climate that is characterized by frequent changes in temperature and moderate amounts of precipitations. The area is subject to precipitation from normal rainfall, thunderstorms, and heavy rains associated with hurricanes and snowfall. The mean annual temperature in the Lackawaxen Basin is about 50°F. The range of mean monthly temperature varies from about 72°F in July to about 28°F in both January and February. The average frost-free period is about 130 days per year.

3-04. Dam and Lake Characteristics.

a. Embankment. The dam is a rock faced, earth filled structure across the valley of the Lackawaxen River, just north of the village of Prompton. The top of the dam is surfaced with gravel to serve as a maintenance road. The top of the dam is at elevation 1226 with the spillway located in the west abutment. The spillway is an ungated structure with crest at elevation 1205.

b. Outlet Works. The outlet works is a concrete structure which houses components including an intake transition pipe, an intake well, standard use concrete stop logs, emergency wood stop logs. debris interceptors and grating.

c. Reservoirs. The reservoir when filled to the recreation pool level, elevation 1125, is approximately 2 1/2 miles long and 1/16 file wide at the point of maximum width. The averge depth of the reservoir is about 20 feet, and the maximum depth is 39 feet. During FY 81, the Philadelphia District was operating Prompton Lake for drought contingency water supply purposes. Normal pool elevation from 12 Feb 1981 to 30 Sept 1981 was 1135.0. This was temporary Storage Elevation. The total water supply storage available was 1.14 billion gallons, which included temporary storage approved by the North Atlantic Division Office.

3-05. Geological Patterns. The topography of the region is of moderate relief. Flat or semi-rounded ridges, marking an older plateau topography, occur at elevations of from 1500 feet to 1650 feet above sea level.

1/ Climatological Data - 1980/81, Table 1

Bedrock valleys, the lower parts of which are obscured by glacial accumulations, are eroded to depths of 500 feet to 600 feet in horizontal sedimentary rock. Above five miles west of the Lackawaxen River, the nearly uniform ridge level is broken by the Moosic Mountains, which extend in height from 2,000 feet to 2,300 feet above sea level. The direction of principal drainage courses is from west to east, from the headwaters of streams in the Moosic Mountains. Due to glaciation, the topography has a distinct orientation in a north-south direction.

The rounded crests of ridges, and character of soils sediments indicate the effects of Pleistocene glaciation. Where exposed in extensive areas high above the valey floor, the bedrock presents a combination of flat surfaces and vertical faces, caused by glacial abrasion and plucking. Glacial stream-deposited sand and gravel form flat-topped or sloping terraces, knolls and ridges along the valley sides. This type of overburden does not occur at the dam site, but does occur in the valley, several miles upstream. A glacial ground moraine, comprised of sand, gravel silt and clay mixtures, together with builders, occurs within the valley in the higher ground and throughout the elevated ridge areas. This formation is generally unstratified and frequently is sufficiently compact to be comparable to glacial till. It occasionally contains, however, assorted or semi-stratified lenses or layers of sand and gravel. This moraine type of deposit is well developed throughout the dam site and adjacent area. Within the park the elevation changes 275 feet.

3-06. Soils. Not all of Wayne County has been surveyed by the Soils Conservation Service, and only one-third of Prompton Lake lies within a surveyed zone.

Because of this a soils map of the area could only be incomplete. The soils talked about here are from that one-third of Prompton Lake, which has been surveyed. Because the vegetation around the lake is all of the same type (typical eastern hardwood forest) it would be logical to assume that the unsurveyed lands have much the same soils as have the surveyed lands.

Soils prevalent in the area were formed in glacial till with the exception of the Basher Silt Loam found on either side of the Lackawaxen River on the downstream side of the dam. They are either channery silt loams or extremely stony silt loams. The soils around the reservoir are moderately to poorly drained, with the exception of the well drained Oquaga soil, and in general do not lend themselves to development.

3-07. Vegetation. Nearly all relatively flat lands in the drainage basin have been cleared and farmed - principally for grass, hay, grain and corn to sustain dairy operations. Uncleared land contains an abundance of second growth hardwoods with a heavy mixture of Birch, Beech, Maple, Ash, Black Cherry, Oak and Hickory. Interspersed throughout these stands, substantial growth of White Pine, Eastern Hemlock and Spruce can also be found.

3-08. Land Use. Prompton State Park is a small park with three public use activities now present: picnicking, boating and swimming. The public use areas for picnicking and swimming remain much the way they were built by the Corps in 1962 while the boat launching area was constructed by the Commonwealth of Pennsylvania in 1971. From January 1, 1966 to July 1 1981, the Corps leased the park to the Commonwealth of Pennsylvania to operate and maintain the recreational facilities and manage the adjacent lands and waters. The park area ia now maintained by the Corps of Engineers.

Lands north of the lake are devoted partially to farming, heavily to private recreational pursuit and to a limited degree to timber production.

SECTION IV - WATER QUALITY DATA

4-01. Purpose of Sampling Program. The purpose of taking water samples on a regularly scheduled basis is to add to our base line inventory of water quality parameters within the areas influencing and influenced by the lake. Refer to Plate 1 for sampling point locations.

The data collected and documented will be useful in determining the kinds of pollutants that may occur in the watershed and within the lake environment. From this data, the Corps through the Pennsylvania DER, can initiate corrective action to control or minimize these sources of pollution. It is the Corps' intent to maintain sources of a meaningful water quality program and to conform with the Pennsylvania (DER) standards as outlined in Chapter 93, Water Quality Criteria.

4-02. Testing Procedures and Equipment. Water samples are being collected on a year round basis by personnel of BCM (contract) twice per month from April through November and once per month for the remainder of the year. These samples are being analyzed by a certified laboratory (under contract) for pH, dissolved oxygen, total dissolved solids, ammonia, specific conductance, nitrate, nitrite and phosphorous. In addition, algal and bacteriological samples are also collected and analyzed by a certified laboratory.

4-03. Data Available. 1/ Considerable data has been collected and documented for future use in project regulation, pollution detection and to initiate protective measures for stream inflows and lake waters to conform with Pennsylvania (DER) Regulations, Chapter 93.

1/ Appendix A - Water Quality Report.

Beginning in May 1975, a water quality management program, of a more intensive nature, was instituted through contracted services. Water Quality data, temperature, dissolved oxygen, conductivity, pH, phosphorous, total dissolved solids, nitrate, nitrite and ammonia has been collected and documented on a regular basis. In addition, algal and bacteriological sampling has continued on a regular basis for the past several years. On the basis of this accumulated data, the Philadelphia District evaluates and applies this information in the management of the lake waters.

The Environmental Branch coordinates meetings with the Pennsylvania Department of Environmental Resources for the purpose of enlisting their assistance in conducting biological and chemical surveys of stream inflows and lake waters at Corps Project in the Philadelphia District.

Water samples for total coliform testing are also collected regularly and analyzed by personnel of the contractor (See Appendix A). The current bacteriological quality of the water at Prompton Lake in acceptable and meets the Pennsylvania DER standards as outlined in Chapter 93: Water Quality Criteria.

Stratification sampling results (Appendix A/B) indicate that the Water Quality at Prompton Lake meets Pennsylvania (DER) standards. Parameters analyzed were dissolved oxygen, pH, ammonia, nitrate, nitrite and phosphorous. Biologically, the lake remained productive throughout the summer and fall seasons.

The documented data supports the premise that the water quality of Prompton Lake meets Pennsylvania;'s DER standards, however, at times,

minor problems arose due to moderate algae concentrations, but these cleared up due to the flushing action of heavy rains and increased stream flows.

4-04. Water Chemistry

a. Nitrogen.

As expected, the nitrogen levels in the feeder streams for the reservoir and the outlet followed rainfall patterns. The in-pool levels showed peaks and valleys of longer duration due to the moderating effect of the reservoir. The data documented during the past year indicated that the nitrates were declining May and July. The major source appears to be runoff since the peaks in the feeder stream precede the peaks in the reservoir. The peaks in ammonia nitrogen concentration correspond to the high Dissolved Oxygen levels. These peaks are reduced or eliminated as rainfall breaks stratification and flushed the excess ammonia nitrogen from the pool.

b. Phosphates.

The phosphorous levels in the pool and feeder streams are correlated directly with rainfall. The peaks correspond to rainfall and may indicate that the source of phosphate is runoff from farms and leachate from septic systems. There are no treatment plants capable of removing phosphate in this drainage area. The spring and fall peaks correspond to the overturns. This is due to a large amount of colloidal phosphorous being removed from the bottom muds and returning to solution.

The August - September peak may also be the result of the Blue-Green Algae bloom. Blue-Green Algae excrete filterable phosphorous that washes through the reservoir showing up in the analysis at station P-3. This peak corresponds to the die off of the algae bloom and fall rains so it is difficult to ascertain the true source of this peak from available data. The level of phosphorous in the Lackawaxen River above the reservoir is still decreasing since the last water quality report was prepared. The available data is not adequate to determine if this is a permanent trend or if this is only a temporary reduction. The reduction may be due to a decrease in farming activity and an increasing use of low phosphate detergents.

c. Dissolved Oxygen

Dissolved oxygen at both stations P-1 and P-3 remained within the range normally found in surface water the entire year. There is a possibility that D.O. levels are depressed below the reservoir when a large amount of organic matter is flushed from the reservoir. This would be particularly noticeable on a warm summer night when decaying organic matter uses the oxygen in the water and respires carbon dioxide. Results of the dissolved oxygen oxygen levels shows a decreasing trend from above the reservoir to the pool and then an increase below the dam. This indicates the water is being aerated sufficiently.

d. pH

The pH for surface water remained for the most part in the acidic range with the lowest value occurring during NOVEMBER at, P-2 (6.2). Conditions in the reservoir reflected the slightly acidic nature of the Lackawaxen River that flows into Prompton Reservoir.

e. Total Dissolved Solids (TDS) and Specific Conductance.

The relationship between TDS and specific conductance found in the Lackawaxen River and Prompton Reservoir react as it was expected to. Dissolved solids in the reservoir showed an increase from Oct to November and then started to decline once again till September. A peak was reached on Nov 12 with a reading of 168 mg/l. Specific conductance demonstrated a general increasing trend form Oct through July with the highest heading of 100 umhos/cm on 21 July. Conductivity and dissolved solids tests were not conducted on a year round basis. Therefore a specific trend is not drawn from the months of available data.

4-05. COLIFORM SAMPLING.

The coliform counts 1/ at Prompton Reservoir remained generally within the limits established by the Pennsylvania Department of Environmental Resources of no more than a geometric mean of 200 colonies per 100 milliliters of sample for fecal coliform and no more than 5,000 per 100 milliliters of sample for total coliform. The high count of 21 July is attributed to runoff rather than a point a source

Bacteriological testing of water samples began in October of 1980. Samples are collected by contract personnel of BCM. The water samples are tested for total, fecal and fecal streptococcus coliforms in accordance with procedures outlined in Standard Methonds for the Examination of Water and Waste Water, 14th Edition. The data obtained from the contractor can be found in (Appendix A) of this report. The documented data (coliform counts) are within the allowable limits as prescribed to Pennsylvania's Water Quality Criteria, chapter 93.

1/ Appendix A - Water Quality Report.

The coliform counts from the beach remain within the limits the Pennsylvania Department of Environmental Resources has established for public swimming areas.

SECTION V - INTERPRETATION OF DATA

5-01. General Post-Impoundment Conditions. Occasionally an acid condition occurs within the lake usually after a heavy rainfall. A flushing action of the swamps in the headwaters occurs during such prolonged rains which cause a temporary acid condition within the lake. However, this condition doesn't last very long, because this same flushing action (flooding) also cleanses the lake. Some turbidity of the lake occurs during this cycle but this is also short-lived. This condition varies from light to heavy depending on temperature, pH, light and chemical action that may occur.

Analysis of data 1/ collected by the Philadelphia District indicates that the water quality of lake waters meets the standards as set forth in the Clean Streams Law, ref. Title 25, Chapter 93. Documented data indicates that generally throughout the summer season, water quality remains good and is acceptable for recreational pursuits.

5-02. Fishery. Prompton Lake is primarily a walleye-bass (both largemouth and smallmouth) lake with yellow perch, the principal forage fish, especially for the former. Chain pickerel provide sport fishing opportunities in the shallower portion. Brown bullhead populations are excellent. The Pennsylvania Fish Commission stocked the lake in 1981.

Fish Stocking at Prompton Lake

June 25	8400 Walleye
Sept 2	1500 Tiger Muskellunge

5-03. Coordination Efforts with Other Federal and State Agencies.

Close coordination is maintained with the Pennsylvania Fish Commission pertaining to matters such as lake stocking, habitat improvement and the continuance of periodic lake survey.

The Philadelphia District also maintains close cooperation with the Pennsylvania Bureau of Water Quality (DER). This on-going yearly program is beneficial in the District's collection and evaluation of water quality data which is used in lake management decisions.

SECTION VI - RECOMMENDATIONS AND PROPOSED STUDIES

6-01. General. The following recommendations and proposals are made relative to the water quality management and control at Prompton Lake.

a. Maintain present sampling frequency to maintain a closer surveillance over the water quality in the lake.

b. Consider acquisition of additional parameters 1/ to include those presently not being taken in order to complete present data.

c. Continue close cooperation with the Pennsylvania Fish Commission in the management of the lake at Corps Projects, Philadelphia District and initiate improvement of fish habitat both in the lakes and downstream from the dam sites.

d. Maintain close cooperation with Pennsylvania DER's Wter Quality Section to continue present monitoring programs and to expand the program to include additional chemical and bacteriological parameters.

1/ Appendix A - Water Quality Report

e. Correlate data collected from other agencies and established their sampling locations, procedures and equipment used for testing.

f. Maintain a permanent record system of data on hand and other data obtained from all other sources. Such data will be used as a management tool and provide a means for evaluating water quality trends.

g. Investigate the various alternatives that are available to control algae growth, particularly in the upper lake. Some of the alternatives that should be considered are the uses of aqua-screen for bottom coverage, spraying of Diquat and Cutri[illegible] and harvesting of noxious weeds.

6-02. Findings and Co[illegible]. The water sampling program will continue for FY 82 at Prompton L[illegible]

Documented data 1/ collected on water quality for Prompton Lake during the past year indicated that the quality of water remains within the standards established by Pennsylvania (DER) and the U. S. Environmental Protection Agency. In general, following periods of heavy precipitation there is a slight increase in ammonia nitrogen and phosphorous levels with a decrease in the pH.

Bacteriological data 1/ recorded at stream inflow and reservoirs are within the limits established by Pennsylvania DER.

Total phosphate levels were not found to be excessive, however, slight increases were noted at times of high runoff associated with rainfall. In general, it was found that phosphorous levels were lower than in the preceding year.

1/ Appendix A - Water Quality Report - 1980-81

Results on all other parameters have remained uniform and within allowable limits for samples analyzed during the testing period.

The data collected represent samples taken on a regular basis. Patterns and trends are therefore reliable. Sample intervals appear to be adequate.

FUTURE TRENDS

It is recommended that the water quality program continue as in previous years plus the addition of several other parameters. Agricultural pollution appears to be the single greatest threat to water quality in the lake.

The monitoring program for Prompton Reservoir during FY 1982 will be similar to the past year's. Samples for chemical and bacteriological analysis will be collected under contract by BCM and presented to the Philadelphia District in report form. Consideration will be given to the control of algae and noxious weeds, using one of the following alternatives: (1) use of chemical sprays, (2) removal by harvesting, (3) and by the placement of aqua-screen at the greatest area of infestation.

CONCLUSION

The water quality at Prompton Reservoir seems to be improving based on the nitrogen and phosphate levels. The effect of this is not known since not enough data has been collected to determine if this is a short or long term reduction in nutrient levels. The lake stratifies during the late summer but severe summer storms break stratification and reoxygenate the hypolimnion.

The bacteria levels remain within the limits established by the regulatory agencies and indicate no pollution from point sources above the dam.

APPENDIX A

WATER QUALITY REPORT - 1980-1981

Betz • Converse • Murdoch • Inc.

PROMPTON LAKE WATER QUALITY SAMPLING

INTRODUCTION

The Philadelphia District of the Corps of Engineers has established a water quality monitoring program at numerous lakes within their jurisdiction, in order to ensure that good water quality is maintained and that the Pennsylvania water quality standards outlined in Chapter 93 are being met. Betz•Converse•Murdoch•Inc. (BCM), under contract to the Philadelphia District, has conducted a water chemistry testing program at Prompton Lake for water year 1981 (October 1980 to September 1981). The following report presents the results of the testing program and an analysis of the data.

SAMPLING PROCEDURES

The Prompton Reservoir is located on the Lackawaxen River near Honesdale, Wayne County, Pennsylvania. The following three stations were sampled six times during water year 1981:

P-1 Lackawaxen River west of PA Route 170

P-2 Prompton Lake at boat launching site

P-3 Downstream of Prompton Dam on Lackawaxen River opposite gauging station

At each station, water samples were collected just below the surface, iced, and delivered to the BCM analytical laboratory within 24 hours. They were analyzed for biochemical oxygen demand (BOD_5), total phosphorous, ammonia nitrogen, nitrate nitrogen, nitrite nitrogen, and total dissolved solids. All analyses were performed in accordance with the current procedures approved by the United States Environmental Protection Agency. Dissolved oxygen, pH, temperature and conductivity were measured in the field. Additional lake samples were collected in sterile bottles on May 26, 1981 for bacteriological analysis. The drinking water source at the Prompton COE building was also sampled in July and September.

PENNSYLVANIA WATER QUALITY STANDARDS

From its source to the Prompton Reservoir, the Lackawaxen River Basin is listed as high quality waters with protected use for cold water fishes (HQ-CWF) in Pennsylvania Chapter 93 Water Quality Standards. The main stem of the Lackawaxen River from Prompton River to Dyberry Creek is listed as high quality waters with a protected use for trout stocking (HQ-ISF). Table 1 presents the Pennsylvania water quality standards for the Lackawaxen River Basin from its source to Prompton Reservoir for the parameters analyzed in the 1981 water year sampling program.

WATER CHEMISTRY RESULTS

Table 2 presents the water quality data collected at Prompton Reservoir during water year 1981. The following figures present plots of the three parameters showing the greatest variation during the sampling period - total phosphorous, ammonia nitrogen, and nitrate nitrogen. The following is a discussion by parameter of the sampling results.

Biochemical Oxygen Demand (BOD) and Dissolved Oxygen:

Dissolved oxygen levels were above the 7.0 mg/l state standard for all sampling dates except September 29, 1980. Dissolved oxygen readings on that date varied from 6.0 at Station P-2 to 6.6 at Station P-1. BOD_5 values were all less than or equal to 3 mg/l, except at Stations 2 and 3 on September 2, 1981, which were 11 and 9 mg/l, respectively. These higher, but moderate, BOD_5 values could be due to the lake turnover period since ammonia levels were slightly elevated on that data also.

Nutrients:

Ammonia, nitrate and nitrite nitrogen were all below the state standards during the sampling period. Nitrate levels were highest during the November sampling which would be expected due to the reduced biological activity in the winter months. Ammonia levels were slightly elevated during early November 1980 and September 1981, which could be due to lake turnover. These two peaks can be readily seen in the nitrate plots for Stations P-2 and P-3. Although no rainfall data were collected, it is likely that the November 12, 1980 sampling followed a rain storm, since ammonia levels are high in Lackawaxen River as well as the lake and below the dam. Phosphorous levels below the dam are elevated on that date as well as total dissolved solids levels.

It is recommended that total phosphorous levels be less than 0.02 mg/l in order to limit the chances of eutrophication. Total phosphorous levels at Station P-2 in the reservoir ranged from 0.01 to 0.15 mg/l.

Total Dissolved Solids and Conductivity:

Total dissolved solids ranged from 29 to 168 mg/l; highest values were recorded on November 12, 1980. Six conductivity levels remain stable on that data. The elevated dissolved solids are probably due to inert materials. Conductivity levels ranged from 60 to 100 umhos/cm, with highest levels being recorded on July 21, 1981.

pH:

The pH values range from 6.2 to 7.8. These values reflect the slightly acidic nature of the Lackawaxen River.

Bacteria:

Samples were collected from the Lackawaxen River and the boat launch on May 26, 1981 and July 22, 1981 for analysis of fecal coliform, total coliform and fecal streptococcus. The bacterial levels are well below the state standards for fecal coliform (200/100 ml). The drinking water sampled at Prompton in July and September showed no evidence of bacterial contamination.

SUMMARY

Water quality samples were collected at three stations six times during the water year 1981 at the Prompton Reservoir. Except for the dissolved oxygen values recorded on October 29, 1980, all parameters are within the state standards. These dissolved oxygen values (6.0 - 6.6) are high enough and should not cause concern. The other parameters indicate that the lake has good water quality with a low and well balanced nutrient supply.

TABLE 1

PENNSYLVANIA WATER QUALITY STANDARDS

Lackawaxen River Basin - Source to Prompton Reservoir

Ammonia Nitrogen - Not more than 0.5 mg/l

Bacteria - During the swimming season (May 1 through September 30), the fecal coliform level shall not exceed a geometric mean of 200 per 100 milliliters (ml), based on five consecutive samples each sample collected on different days; for the remainder of the year, the fecal coliform level shall not exceed a geometric mean of 2,000 per 100 ml, based on five consecutive samples collected on different days.

Nitrite plus Nitrate - Not to exceed 10 mg/l as nitrogen

pH - Not less than 6.0 and not more than 9.0

Dissolved Oxygen - No value less than 7.0 mg/l

Temperature - No rise when ambient temperature is 58°F or above; not more than 5°F rise above ambient temperature until stream temperature reaches 58°F; not to be changed by more than 2°F during any one-hour period.

Total Dissolved Solids - Not more than 500 mg/l as a monthly average value; not more than 750 mg/l at any one time.

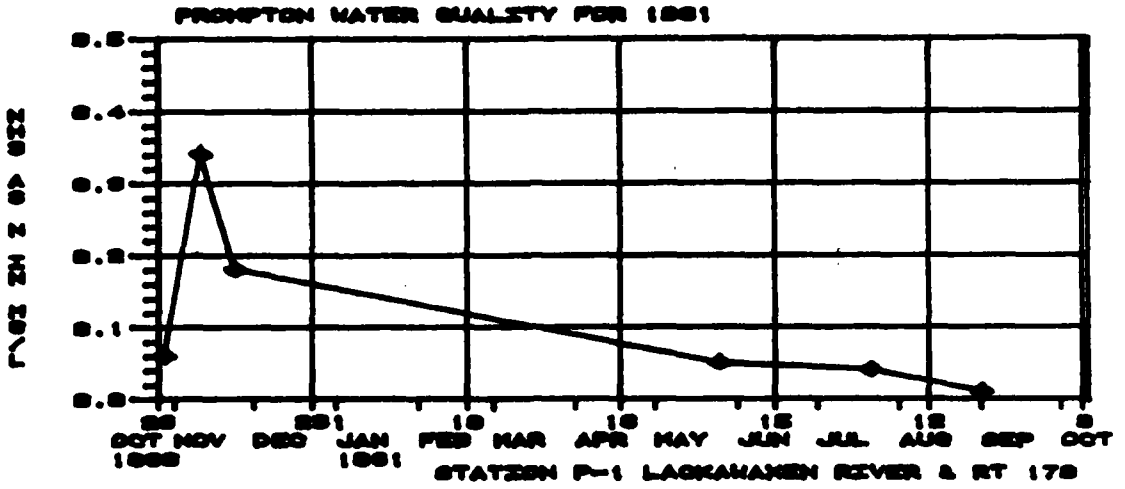
Source: PA Chapter 93 Water Quality Standards, Title 25, Part 1, Subpart C, Adopted August 21, 1979.

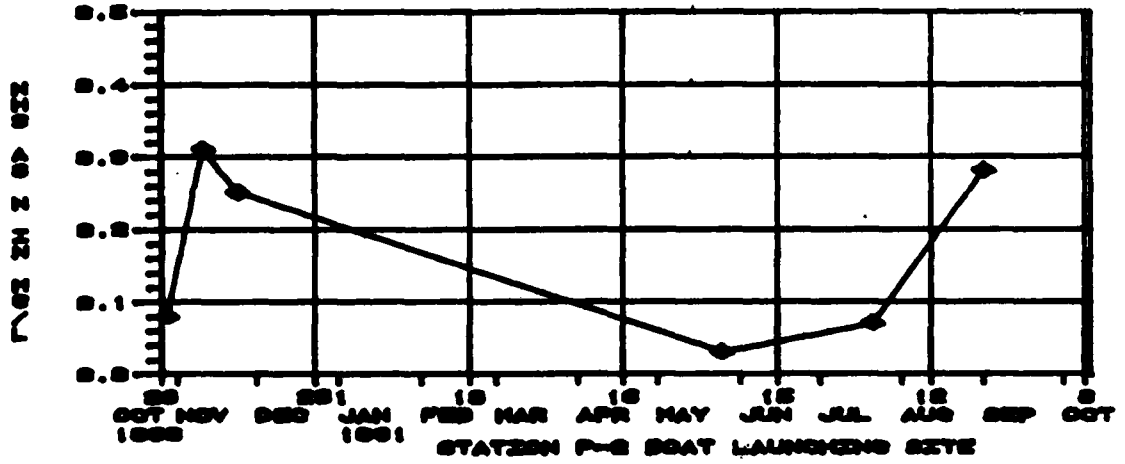
Table 2

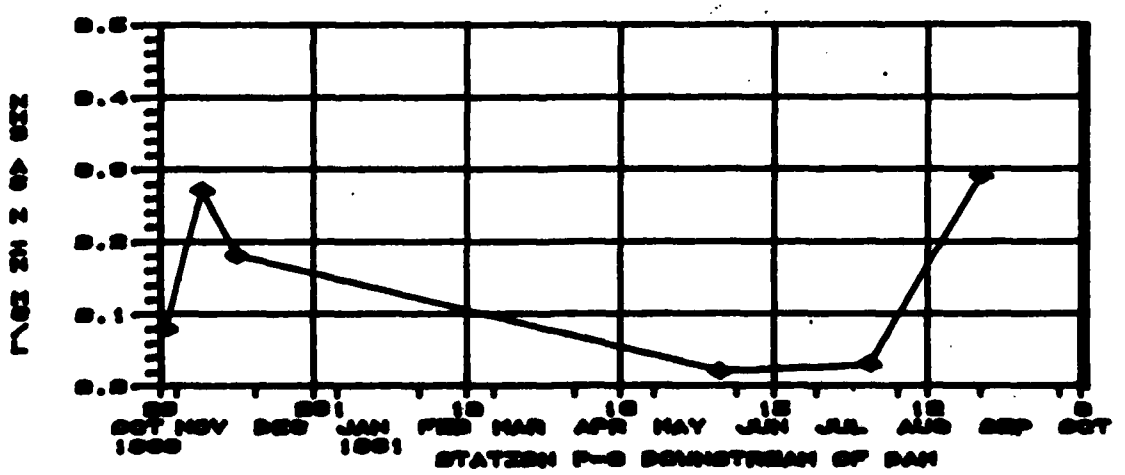
PROMPTON LAKE WATER QUALITY SAMPLING WATER YEAR 1981

MM/DD/YY	SITE	BOD	TP-P	NH3-N	NO3-N	NO2-N	DS	DO	pH	TEMP	COND	FC	TC	FS
10/29/80	1	<3	0.01	<0.06	0.70	<0.10	71	6.6	6.8	6.0	65			
10/29/80	2	<3	0.05	0.08	0.42	<0.10	60	6.0	7.4	12.0	65			
10/29/80	3	<3	0.04	0.08	0.35	<0.10	78	6.5	7.3	12.0	70			
11/12/80	1	<2	<0.01	0.34	<0.10	<0.10	35	10.0	7.0	7.0	70			
11/12/80	2	<2	0.05	0.31	1.70	<0.10	160	8.0	6.2	8.5	70			
11/12/80	3	<2	0.07	0.27	1.02	<0.10	168	11.5	7.2	5.0	68			
11/25/80	1	<3	0.04	0.18	0.84	<0.10	80	9.8	6.8	4.0	65			
11/25/80	2	<3	0.04	0.25	4.84	<0.10	61	9.0	6.8	6.0	60			
11/25/80	3	<3	0.03	0.18	2.78	<0.10	56	10.8	6.6	4.0	66			
05/26/81	1	3	0.02	0.05	0.58	<0.10	29	9.3	7.8	21.0	84	20	50	50
05/26/81	2	3	<0.01	0.03	0.57	<0.10	37	10.1	7.1	21.5	79	2	50	9
05/26/81	3	3	<0.01	0.02	0.40	<0.10	38	9.4	7.1	21.0	78			
07/21/81	1	<3	0.10	0.04	0.46	<0.10	30	8.1	6.4	22.0	100	530	>8000	170
07/21/81	2	<3	0.04	0.07	<0.10	<0.10	43	7.9	6.8	25.0	95	250	>8000	240
07/21/81	3	<3	0.05	0.03	<0.10	<0.10	42	7.6	6.8	25.0	100			
09/02/81	1	<3	0.01	0.01	0.39	<0.10	94	8.4	7.5	19.0	83			
09/02/81	2	11	0.02	0.28	0.04	<0.10	77	7.6	7.5	22.0	74			
09/02/81	3	9	<0.01	0.29	0.02	<0.10	67	8.1	7.6	20.0	80			
MAXIMUM		11.0	0.10	0.34	4.84		168	11.5	7.8	25.0	100			
MINIMUM		2.0	0.01	0.01	0.02		29	6.0	6.2	4.0	60			
RANGE		9.0	0.09	0.33	4.82		139	5.5	1.6	21.0	40			
MEAN		3.6	0.03	0.14	0.86		68	8.6	7.0	14.5	76			
STAN DEV		2.4	0.02	0.12	1.20		40	1.5	0.4	8.0	12			

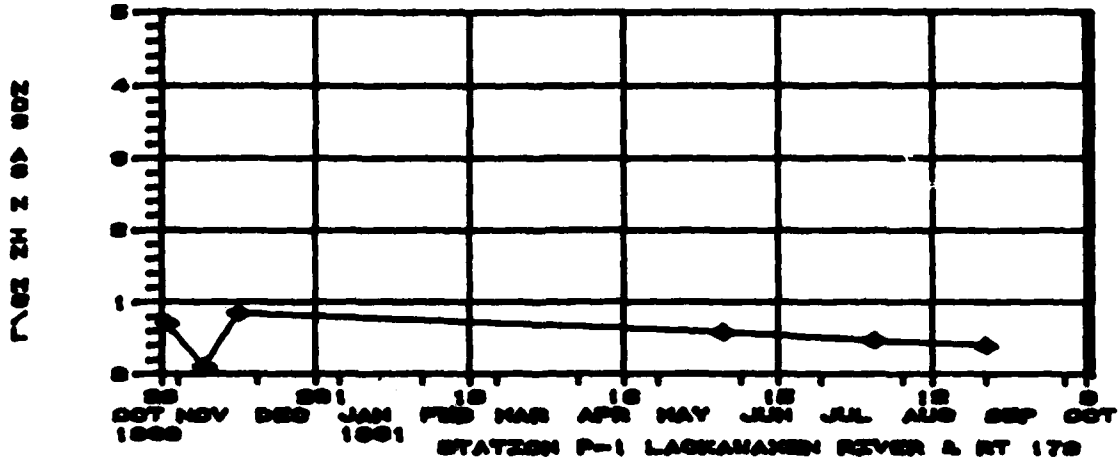
All units are mg/l except: pH in standard units, Temp in degrees centigrade, Conductivity in umhos/cm and the bacteriological results in #/100 ml.


PROMPTON WATER QUALITY FOR 1981
0.5
0.4
0.3
0.2
0.1
0.0
OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT
1980 1981
STATION P-1 LACKAWAXEN RIVER & RT 170

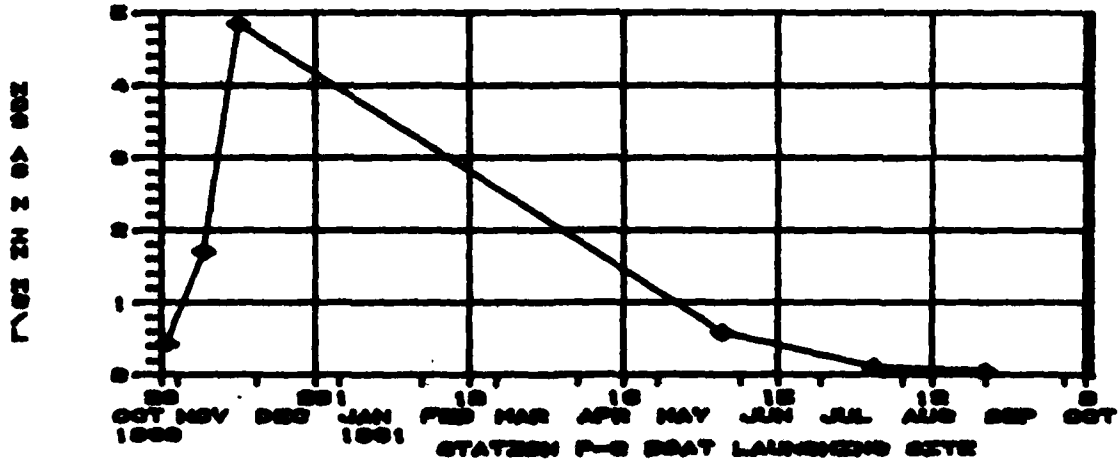

0.5
0.4
0.3
0.2
0.1
0.0
OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT
1980 1981
STATION P-2 BOAT LAUNCHING SITE


0.5
0.4
0.3
0.2
0.1
0.0
OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT
1980 1981
STATION P-3 DOWNSTREAM OF DAM

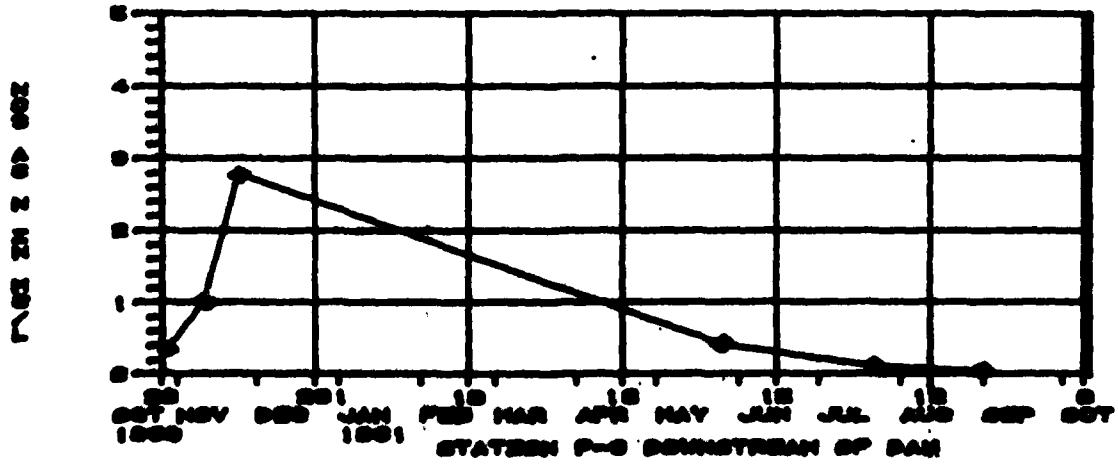
PROCTER WATER QUALITY FOR 1981



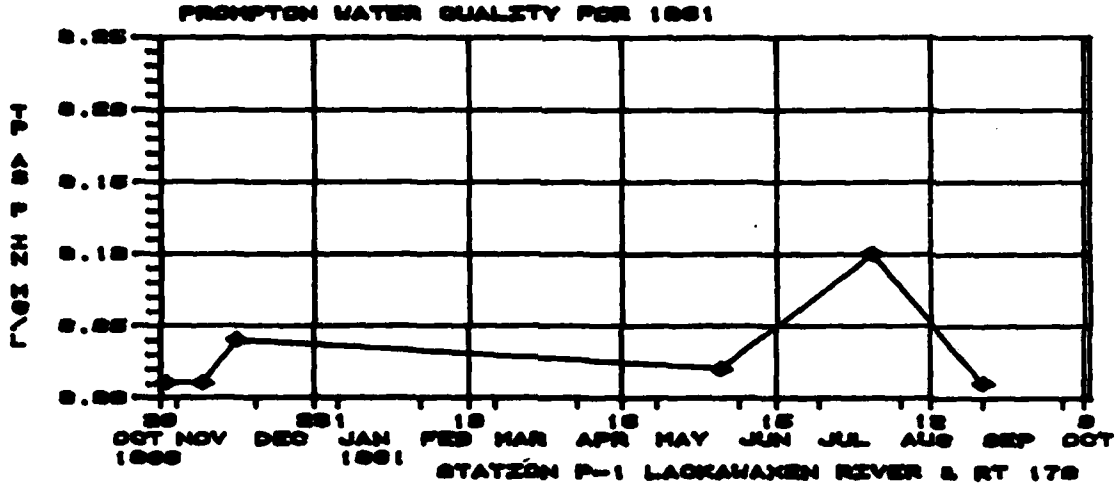
STATION P-1 LACKAMAS RIVER @ RT 170

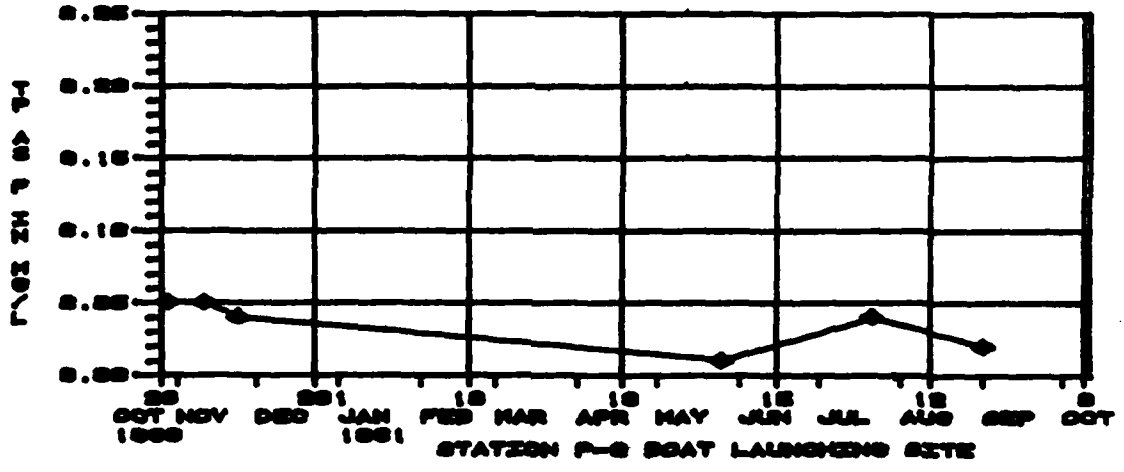


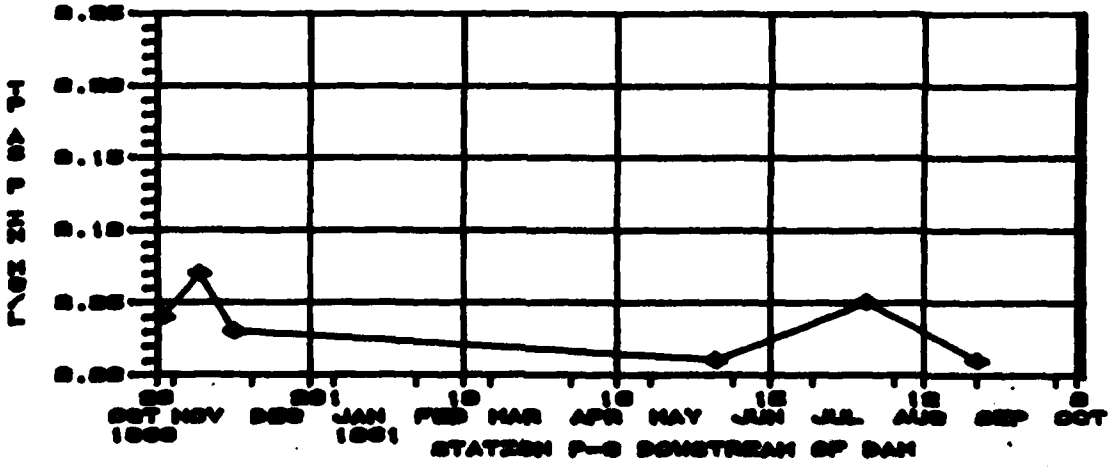
STATION P-2 BOAT LAUNCHING SITE

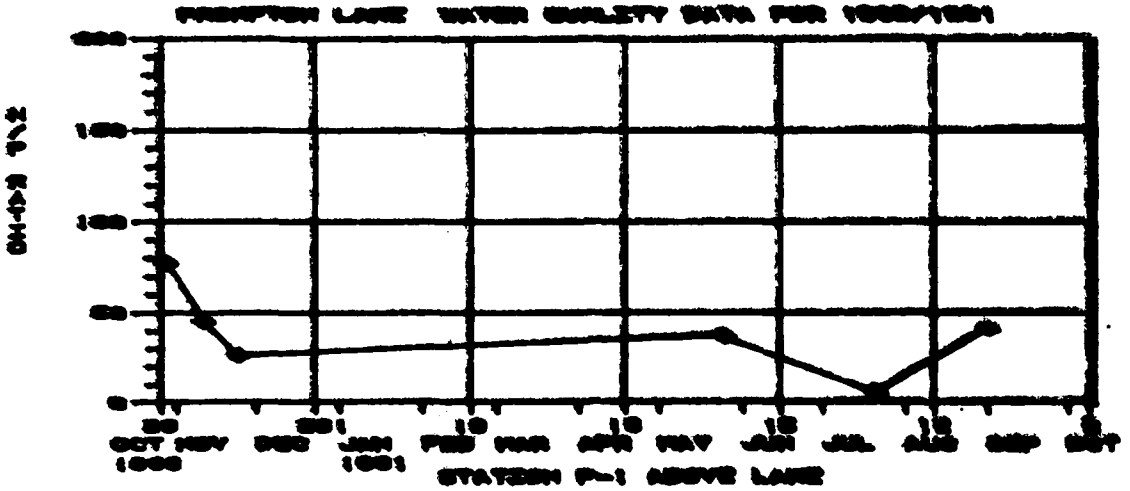


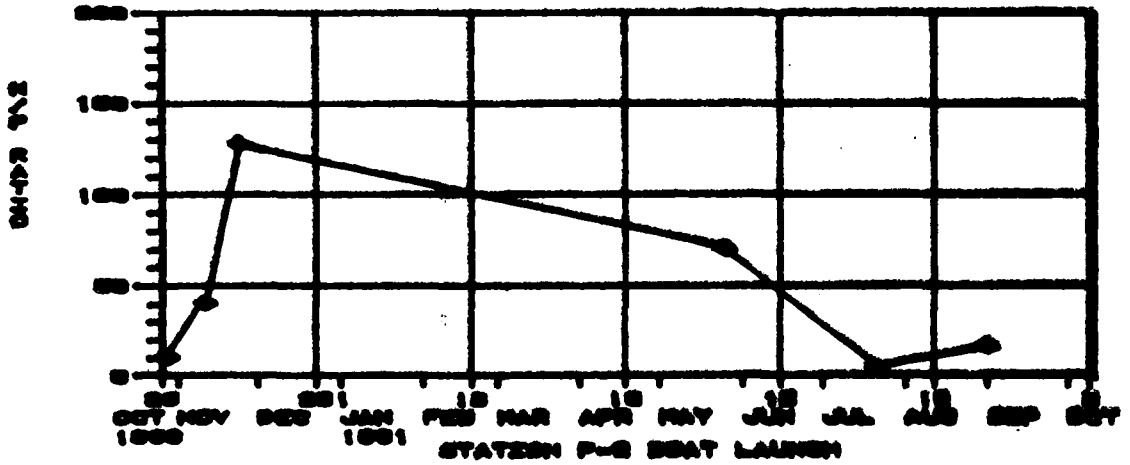
STATION P-3 DOWNSTREAM OF DAM


PROMPTON WATER QUALITY FOR 1981
TOTAL PHOSPHORUS MG/L
0.25
0.20
0.15
0.10
0.05
0.00
30
OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT
1980
1981
STATION P-1 LACKAWAXEN RIVER @ RT 170


TOTAL PHOSPHORUS MG/L
0.25
0.20
0.15
0.10
0.05
0.00
30
OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT
1980
1981
STATION P-2 BOAT LAUNCHING SITE


TOTAL PHOSPHORUS MG/L
0.25
0.20
0.15
0.10
0.05
0.00
30
OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT
1980
1981
STATION P-3 DOWNSTREAM OF DAM


STATION P-1 ABOVE LAKE


STATION P-2 BOAT LAUNCH

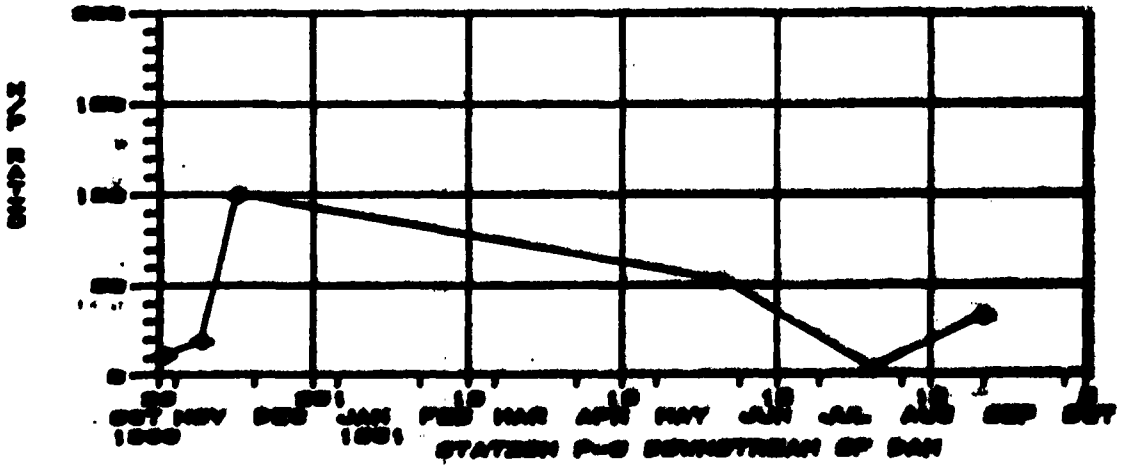
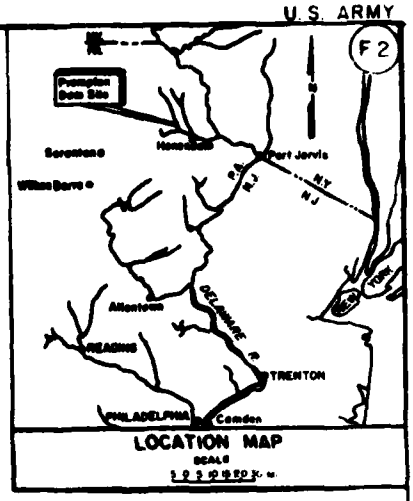

STATION P-3 DOWNSTREAM OF DAM

PLATE 1

LOCATION MAP AND SAMPLING STATIONS

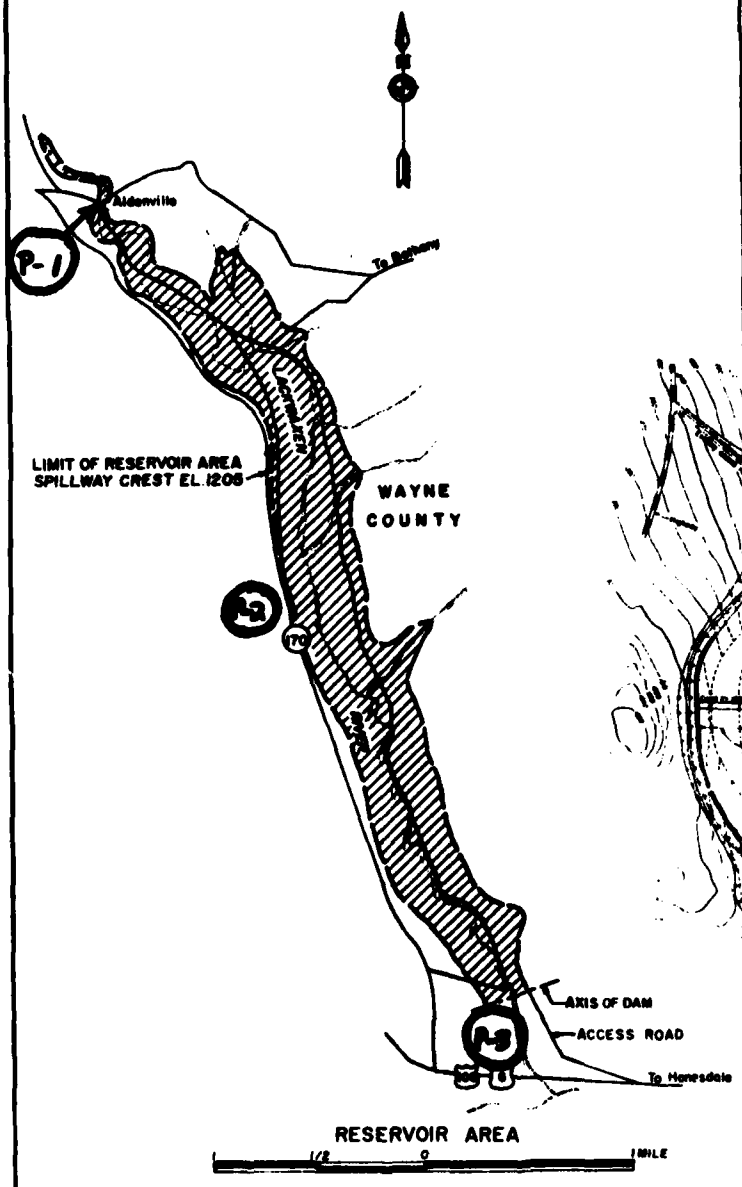
CORPS OF ENGINEERS

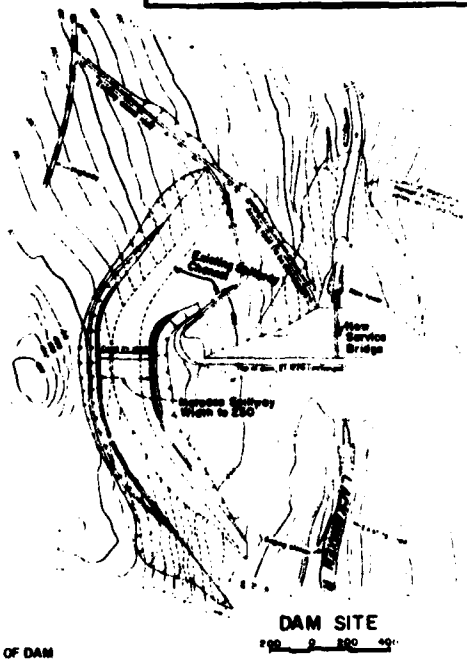
U.S. ARMY



LOCATION MAP

SCALE



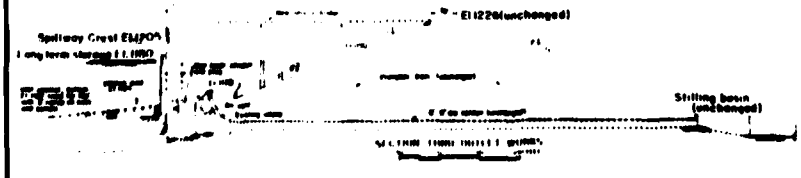


DAM SITE

P-1 Lackawaxen River west of Pa. Route 170

P-2 Prompton Lake at Launching Site

P-3 Downstream of Prompton Dam on Lackawaxen River opp. Gauging Sta.



LACKAWAXEN RIVER, PA.

FLOOD CONTROL PROJECT

PROMPTON RESERVOIR

RESERVOIR AREA

PLAN AND SECTION

30 JUNE 1968

SCALE AS SHOWN

U.S. ARMY ENGINEER DISTRICT PHILA

LOCATION MAP & SAMPLING STATIONS PLATE 1

PLATE 2

POOL ELEVATION DRAWDOWN
(Available in NAPEN-E Files)

TABLE 1

PROMPTON LAKE - CLIMATOLOGICAL DATA - 1980-81

TABLE 1

CLIMATOLOGICAL DATA - Oct 1980 - Sept 1981

MONTH	Precp. (inches)	Total Snow (inches)	Avg. Temp. (oF)	Highest Temp. (oF)	Lowest Temp. (oF)	Days with Precp.
October data not available						
NOV.	4.16	12.0	31.4	57	12	12
DEC.	1.63	10.5	19.1	56	-24	5
JAN.	.81	12.6	13.4	49	-23	2
FEB.	6.90	9.0	27.3	57	- 8	18
MAR.	.60	-	28.6	70	-5	1
APRIL	-	trace	45.4	75	18	14
MAY	3.37	0	54.7	82	-	8
JUNE	5.32	0	60.5	86	37	19

Data for July-Sept not available at time of report preparation.

1/ Extracted from the Monthly Summary Report - NOAA. Data collected at Pleasant Mount Station (12 air miles north of Prompton Lake).

END

DATE
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2-82

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