Water Quality Status Report No. 16

UPPER SNAKE RIVER BASIN

ENVIRONMENTAL PROTECTION AGENCY
Surveillance and Analysis Division

March 1, 1973

WATER QUALITY STATUS

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INTRODUCTION

Historically, the Upper Snake River (Milner Dam to the Idaho-Wyoming border) has experienced high bacteria concentrations and massive algal blooms. The algal blooms are not only an aesthetic problem but also contribute to depressions of dissolved oxygen (D.O.) within the river. Massive fish kills have occurred as a direct result of these algal blooms. The algal blooms result in part from high nutrient concentrations in the river.

Studies of the Upper Snake River by the EPA are continuing in order (1) to determine the interrelationships between the above water quality problems and (2) to determine the cause-effect relationships between point and non-point sources of waste loading to the river and the river water quality. Intensive water quality surveys were conducted by the EPA for the above purposes during October 1971, March 1972, and August 1972. The results of these surveys along with other Upper Snake River water quality data are discussed within this report. Locations and descriptions of sampling station locations during the October 1971, March 1972, and August 1972 surveys are shown in Table I and Figures 1, 2, 3, and 4. All tables and figures referred to in this report are contained in Appendix A and Appendix B, respectively. Appendix C contains current and proposed surveillance activities in the Upper Snake River.

The studies of the Upper Snake River have been designed to provide data which can be applied to several questions which ultimately must be answered before implementation of the Federal Water Pollution Control Act of 1972. These questions are:

1. Which reaches of the Upper Snake River are effluent limiting and which are water quality standards limiting?

2. Will best practicable treatment of municipal and industrial effluents eliminate the water quality problems in the Upper Snake River?

3. Will best available treatment of municipal and industrial effluents eliminate the water quality problems in the Upper Snake River?

4. Will elimination of municipal and industrial effluents eliminate the water quality problems in the Upper Snake River?

FINDINGS

Survey Results

1. Five day biochemical oxygen demand (BOD_5) loading to the Upper Snake River is four times greater during food processing season than during the irrigation season.

2. Dissolved oxygen (D.O.) water quality standards were violated during both the October 1971 survey and August 1972 survey in reaches of the Snake River between Roberts (RM 320) and American Falls Reservoir (RM 737), in American Falls and Milner Reservoirs, and in the Portneuf, Henrys Fork, and Teton Rivers.

3. The entire study reach of river (RM 844 to RM 639) had ortho-phosphorus concentrations above the bloom potential threshold of 0.01mg/l during both the irrigation and food processing seasons.

4. Total phosphorus loading to the river was 33% greater during irrigation season than during food processing season. The main sources of phosphorus during irrigation season are inputs to the river other than industrial and municipal effluents whereas during food processing season main sources of phosphorus are industrial and municipal effluents.

5. The major phosphorus loadings from irrigation returns and other inputs into the river other than industrial and municipal discharges occur above American Falls Dam (RM 714). Over 90% of the total irrigation return flows' phosphorus loading enters the Snake River above American Falls Dam.

6. Approximately 21% of the total phosphorus loading to the Upper Snake River, during food processing season, enters the river above Idaho Falls (RM 805). Approximately 28% of the total phosphorus loading to the river during irrigation season was contributed by sources above Roberts (RM 820). Nearly half of the phosphorus in the river above Roberts during both seasons is due to Henrys Fork River.

7. During irrigation season, nearly 60% of the phosphorus load in the river between Roberts (RM 820) and Milner Dam (RM 640) is contributed by sources other than industrial and municipal. This includes background loading in the river, irrigation returns, tributaries, canals, springs, and all other inputs.

8. Total coliform water quality standards are frequently violated throughout the Upper Snake Basin.

9. Bacteria concentrations are generally lower in the river during irrigation season than during the food processing season.

10. Potato processors are associated with the highest concentrations of bacteria being discharged from point sources to the river.

Mathematical Model Predictions (One in ten year low flow)

1. The lowest D.O. and the highest total phosphorus concentrations in the river will both occur during October (based on survey data) assuming present and future waste loading conditions.

2. Violations of D.O. standards may continue to occur in the stretch of river from Idaho Falls to American Falls Reservoir even with no discharge of municipal and industrial effluents.

3. The following total phosphorus concentrations will occur in the river (averages for entire study reach) for the type of treatment listed:

Present Waste Loads	0.1 mg/l
Best Practicable Treatment (BPT)	0.1 mg/l
Best Available Treatment (BAT)	0.05 mg/l

CONCLUSIONS

1. Although water quality problems exist during the irrigation season, it appears that most critical conditions are during the early part of the food processing season.

2. Phosphorus appears to be the limiting nutrient in the Upper Snake River controlling the extent of algal blooms which occur in American Falls and Milner Reservoirs and in slow moving reaches of the Snake River.

3. Wastes discharged by food processors are directly or indirectly responsible for the periodic violations of D.O. water quality standards in American Falls and Milner Reservoirs.

4. Municipal waste discharges from the City of Pocatello combined with oxygen depressed groundwater inflows cause periodic violations of D.O. standards in the Portneuf River.

5. If the sources of phosphorus above Roberts are uncontrollable, 100% removal of phosphorus from industrial and municipal sources in the Upper Snake River Basin may not reduce ortho-phosphorus concentrations to below the algal bloom threshold of 0.01 mg/l.

6. Sediments in American Falls Reservoir are rich in phosphorus. Phosphorus releases from these sediments may be sufficient to sustain algal blooms even if upstream sources were eliminated.

7. Reduction of waste loads (BOD and nutrients) from industrial and municipal sources along with limiting the same effluents to less than 1000 total coliforms/100 mls would probably eliminate bacteria re-growth in the river and thereby eliminate the bacteria problem in the Upper Snake River Basin.

RECOMMENDATIONS

1. Surveillance activities as outlined in Appendix C of this report should be conducted.

2. Irrigation return surface flows should be reduced or eliminated by more efficient utilization of irrigation water or by a change in present methods of irrigation in order to reduce phosphorus loads in the river.

PRESENT WASTE LOADS

The two distinct periods of waste loading to the Upper Snake River, the food processing season and the irrigation season, as measured during the October 1971, March 1972, and the August 1972 intensive field surveys, respectively, are discussed in this section. The study discussion is divided into two river reaches--above American Falls Reservoir (RM 844 to RM 714) and below American Falls Reservoir (RM 714 to RM 640). Data discussed includes five day biochemical oxygen demand (BOD_5), nutrients, and bacteria.

Discussion of nutrients is limited to phosphorus since phosphorus has been shown to be the limiting nutrient in the Upper Snake River during critical algal growth periods (see Water Quality Effects Section). Total and ortho-phosphorus were measured in nearly all of the point sources sampled during the October 1971 survey. Total phosphorus was measured in all point sources sampled during the August 1972 survey, while ortho-phosphorus was only measured in approximately three-fourths of all point sources. From this data, ortho-phosphorus appeared to be nearly the same percentage of total phosphorus in point sources during both the food processing and irrigation seasons. Therefore, since total phosphorus data is more complete and is also indicative of ortho-phosphorus, discussion of phosphorus in this report is based on total phosphorus.

Food Processing Season

The waste loading data for all point sources between the City of Roberts and Milner Dam that were sampled during the October 1971 survey are shown in Table II. Waste load percent contributions from these sources are shown in Table III.

Five Day Biochemical Oxygen Demand (BOD_5) -- The main source of oxygen demanding wastes (BOD_5) entering American Falls Reservoir during this season is from industrial and municipal sources. As shown in Table III, four companies contribute 72% of the total BOD_5 load to the reservoir. These companies are Western Farmers, Rogers Brothers, Idaho Potato Starch (Idaho Falls), and American Potato. An additional 11% of the BOD_5 load is contributed by the Idaho Falls and Pocatello sewage treatment plants (STP). These combined sources discharged 70,000 lbs/day of BOD_5.

As shown in Table II, Milner Pool receives approximately 81,000 lbs/day of BOD_5 from point sources below American Falls Reservoir as well as the remaining BOD_5 from the upstream sources. As shown in Table III, nearly 96% of the point source BOD_5 loading enters Milner Pool from three companies: J.R. Simplot, Ore-Ida, and Amalgamated Sugar. Amalgamated Sugar is by far the largest contributor accounting for 60% of the total point source BOD_5 loading into the MMilner Pool.

Nutrients -- As shown in Table II, the principal sources of phosphorus above American Falls Dam are four companies and two municipal STPs

which collectively contribute approximately 82% of the total phosphorus entering American Falls Reservoir from point sources. Western Farmers and Idaho Potato Starch, both of Idaho Falls, and J.R. Simplot and FMC, both of Pocatello, contribute 45% of the total phosphorus load. The Idaho Falls and Pocatello STPs contribute an additional 37%. These sources contributed nearly 1500 lbs/day of total phosphorus to American Falls Reservoir.

Approximately 95% of the total phosphorus point source loading to Milner Pool is contributed by J. R. Simplot, Ore-Ida, and the Rupert STP. These sources contribute 1200 lbs/day of total phosphorus to Milner Pool along with phosphorus loadings already in the Snake River from sources above American Falls Dam.

Bacteria -- The maximum bacteria concentrations and principal sources are shown in Table IV. The highest bacteria levels are associated with the potato processing industry. These industries appear to be the major cause of excessive bacteria concentrations in the river by direct discharge of bacteria and/or by discharging wastes which promote bacteria regrowth.

Irrigation Season

Table V shows waste loading data for all point sources sampled during the August 1972 survey and are listed in order by river mile from the upstream end of the study reach. Irrigation return flows and

tributaries as discussed within this report include essentially all inputs into the Snake River other than industrial and municipal sources and are considered as point sources.

Five Day Biochemical Oxygen Demand (BOD_5) -- As shown in Table V, the total BOD_5 loading from industrial and municipal point sources to American Falls Reservoir was nearly 17,000 lbs/day of which 71% was contributed by the Idaho Falls and Pocatello STPs. Industrial contribution of the industrial-municipal loadings was only a little over 2%. Based on the limited number of irrigation returns and tributaries that were sampled and analyzed for BOD_5, it appears that American Falls Reservoir receives an additional 17,000 lbs/day (approximately 50% of total) of BOD_5 from these sources even though they have low BOD_5 concentrations.

Milner Pool receives approximately 7000 lbs/day of BOD_5 from industrial and municipal sources. Ore-Ida and J.R. Simplot contributed over 81% of this load. Both companies had just begun the new season's operations during the survey. Previous to their startup, total BOD_5 loading to Milner Pool from both industrial and municipal sources would have been only 1300 lbs/day.

Nutrients -- Table VI shows total phosphorus loading and percent contribution data for all sampling stations during the August 1972 survey and for some inflows (Reference - Water District 01, Snake River, Idaho) which were not sampled during the August 1972 survey. The percent

contributions do not include background total phosphorus loadings from Henrys Fork, South Fork and North Fork Teton River, and the Snake River above Lorenzo.

Total phosphorus loadings from sources downstream of the confluence of the Snake River with Henrys Fork to Milner Dam amounted to over 4000 lbs/day (not including background river phosphorus loading). Approximately 44% of this was contributed by irrigation returns and tributaries, 30% by municipal sources, and 26% by industrial sources.

Total phosphorus loadings by irrigation returns and tributaries, were relatively evenly distributed. Unmeasured inflow (calculated by Water District 01) contributed an estimated 8.5% of total phosphorus point source loading. Spring Creek and the Blackfoot River contributed 5.5% and 3%, respectively.

The major phosphorus loadings from irrigation returns and tributaries occur above American Falls Dam as over 90% of the total irrigation and tributary load enters the Snake River above American Falls Dam.

The major municipal contributors of the total phosphorus load were Idaho Falls and Pocatello STPs with 15% and 8.5%, respectively.

Four companies contributed nearly 25% of the total phosphorus loading; these were J. R. Simplot at Pocatello, FMC, J.R. Simplot at Burley, and Ore-Ida.

Bacteria -- Table V also shows average total and fecal coliform data for all sources sampled during the August 1972 survey. Since potato processors were not operating above American Falls Dam, the highest bacteria concentrations were associated with municipal STPs and storm sewers.

However, the operating potato processors, J. R. Simplot at Burley and Ore-Ida, still discharged the highest concentrations of bacteria for the entire stretch of river. Generally, the irrigation returns did not have excessively high bacteria concentrations with the exceptions of Crow Creek, Aberdeen Drain, D4, Rasmussen Drain, March Creek, and the Main Drain. All of these had counts of total coliform over 10,000/100 ml. The Union Pacific Railroad effluent contained 11,000 total coliforms and 5,000 fecal coliforms per 100 mls.

Waste Loading: Seasonal Comparison

The BOD_5 point source loadings during food processing season were approximately four times greater than during the irrigation season. However, total phosphorus point source loadings were one-third greater during the irrigation season.

Five Day Biochemical Oxygen Demand (BOD_5) -- BOD_5 loading from industrial and municipal sources during the food processing season is approximately seven times greater than during the irrigation season as 167,000 lbs/day and 24,000 lbs/day of BOD_5 are discharged, respectively. During irrigation season, the irrigation returns and tributaries constitute an additional estimated 23,000 lbs/day of BOD_5 load to the river. BOD_5 contributions from irrigation return flows and tributaries constitute nearly 50% of the total BOD_5 loading during the irrigation season. Thus, total BOD_5 loading during the food processing season (including irrigation and tributary loading) is about four times greater than during the irrigation season.

Nutrients -- Tables VII and VIII summarize total phosphorus percent contributions from all sources for the stretches of river from Lorenzo to American Falls Dam, from American Falls Dam to Milner Dam, and for the entire stretch of river from Lorenzo to Milner Dam. Unlike the point source contributions in Table III and Table VI, these percent contributions take into account background loadings from the Snake River above Lorenzo, Henrys Fork, and the South and North Forks Teton River.

Total phosphorus loadings for food processing season and irrigation season from all sources were 4300 lbs/day and 5700 lbs/day, respectively. Phosphorus loading during irrigation season is approximately 33% higher than during the food processing season.

Industrial and municipal total phosphorus loading decreased from nearly 3100 lbs/day during the food processing season to 2300 lbs/day during the irrigation season. As shown in Tables VII and VIII, total phosphorus loading from industrial and municipal sources was 34% lower during the irrigation season, declining from 71% to 41% of the total industrial-municipal loading. The total phosphorus loading in the Snake River and the accumulative phosphorus loading curve derived from point source loading are shown in Figures 5 and 6 for the October 1971 survey and August 1972 survey, respectively. The two curves in Figure 5 agree relatively closely especially between Idaho Falls and American Falls Reservoir. This indicates that industrial and municipal loading is the main source of phosphorus. Also shown in Figure 2 is the total phosphorus accumulative curve from municipal and industrial sources. The river loading and total point source accumulation curve agree relatively closely

above American Falls Dam. This indicates that the point sources that were sampled during the August 1972 survey contributed nearly 100% of the river phosphorus loading above American Falls Dam. The municipal-industrial accumulative curve shows that municipal-industrial sources contributed less than half of the river phosphorus loading during the August 1972 survey.

As shown in Tables VII and VIII, 21% and 28% of the total phosphorus loading to the stretch of river from Idaho Falls to Milner Dam during the October 1971 and August 1972 surveys, respectively, was contributed by sources above Idaho Falls. Data obtained from the USGS for October 1971 indicated that nearly half of the phosphorus loading above Idaho Falls was due to Henrys Fork River. EPA data from the August 1972 survey indicated that Henrys Fork contributes 40% of the phosphorus loading above Roberts, Idaho. Henrys Fork receives some potato washing wastes during October and November as well as wastes from municipalities and wastes associated with recreation; however, some of the phosphorus could be from natural sources.

During the irrigation season, river loading above the study reach, irrigation returns and tributaries constituted nearly 60% of the total phosphorus loading.

Bacteria -- Major contributors of bacteria during the food processing season and the irrigation season are the potato processing industry and municipal STPs and storm sewers, respectively. In comparison, bacteria concentrations are much higher in the potato processing wastes than in the municipal STP effluents and in municipal storm sewers.

WATER QUALITY EFFECTS

A review of the existing data shows that water quality problems exist in the Upper Snake Basin. The priority problems as defined by the 1969 regional pollution profile are: (1) dissolved oxygen (D.O.), (2) the parameters associated with aesthetics, and (3) bacteria. The basin pollution problems discussed in this section are based primarily on information obtained during the EPA surveys conducted in October 1971, March 1972, and August 1972. The survey data are presented in Tables IX, X, and XI, respectively, for all river stations and point sources sampled. Water quality data from other agencies are included in the discussion for reference.

Hydrology

The average flow variation in the Upper Snake River from 1928 to 1968 is shown in Figure 7. The low flow season usually occurs between October and March which coincides with the food processing season. The variation in flow of the Upper Snake River is due to reservoir regulation. The Snake River flows for the reaches above and below American Falls Dam during the October 1971, March 1972, and August 1972 surveys are as follows:

	Above	Below
October 1971	10,000 cfs	12,000 cfs
March 1972	10,000	4,500
August 1972	5,500	11,500

Figure 8 shows the river flows during each survey for each station sampled. Unfortunately, the river flows during the October 1971 and August 1972 surveys corresponded to the highest flow on record for that time of the year and to the one in ten year low monthly flow, respectively.

Dissolved Oxygen

The Idaho Water Quality Standards state that the dissolved oxygen (D.O.) concentrations in the Upper Snake River shall not be below 6 mg/l or 100% of D.O. saturation above American Falls Reservoir during times of salmonid spawning, hatching and fry stages (essentially throughout the year) and below 75% of saturation in and below American Falls Reservoir.

The 100% saturation criteria was violated in stretches of river from Roberts, Idaho (RM 820) to American Falls Reservoir (RM 738) during the October 1971 and August 1972 surveys. Past STORET D.O. data (1962 to present) and survey results show that the 75% of saturation criteria had been violated in the lower reaches of the Portneuf River, in American Falls Reservoir, and in Milner Reservoir. D.O. concentrations as measured during October 1971 and August 1972 surveys in the Upper Snake River are plotted vs. river mile and compared to standards in Figure 9.

D.O. criteria violations of the 100% saturation criteria as measured during the October 1971 survey occurred from above Blackfoot to American Falls Reservoir. The BOD load from the food processors in the vicinity

of Idaho Falls apparently depressed the D.O. slightly in that reach. D.O. concentrations were above 9 mg/l but saturation levels are approximately 10 mg/l at water temperatures experienced during this time of the year.

During August 1972, violations of the 100% criteria occurred in the stretch of river from Roberts to Idaho Falls. The D.O. levels increased at Idaho Falls where the river is reaerated by the falls. The D.O. again falls below the 100% saturation criteria between Blackfoot and American Falls Reservoir. The lowest D.O. measured was 6.6 mg/l at Fort Hall which is 79% of saturation (8.2 mg/l).

EPA placed two automatic water quality monitors on the Portneuf River at RM 13.0 and 17.0 from May through September of 1972. Water quality standards were violated during August 1972 with a lowest D.O. measurement of 4.2 mg/l.

American Falls reservoir experiences low D.O. conditions throughout the late summer and fall of the year. The low D.O. conditions usually occur in the hypolimnion of the reservoir due to exertion of BOD from upstream sources. The lowest D.O. concentration measured during the October 1971 survey was 5.8 mg/l in the hypolimnion. Measurement of D.O. in American Falls Reservoir was beyond the scope of the August 1972 survey.

The BOD_5 concentrations and river loading in the Snake River are shown in Figures 10 and 11, respectively, during the October 1971 and August 1972 surveys. The BOD_5 concentrations measured entering and leaving American Falls Reservoir were higher during the August 1972

survey than during the October 1971 survey. However, the total BOD_5 load to the reservoir during the August 1972 survey was approximately 60% of the load during the October 1971 survey. The increase of BOD_5 measured just downstream of American Falls Dam may be due to the discharge of river water from the lower reservoir depths. The river water from the lower depths contains high organic bottom deposits resulting from organic wastes discharged upstream and decaying algae. Organic deposits in American Falls Reservoir sediments depress D.O. an estimated 2 mg/l during the fall of the year.

Milner Reservoir experiences the same D.O. conditions as in American Falls Reservoir except that the D.O. depression is not as pronounced due to the shorter residence time within the reservoir. Past EPA water quality monitoring data shows oxygen depressions throughout the year. Water quality monitoring data collected by the USGS on a monthly frequency since 1968 shows that D.O. standards have been violated several times. The lowest D.O. measurement recorded was 2.8 mg/l taken during the October 1971 survey just downstream of the main drain confluence (RM 647) with the Snake River. D.O. concentrations were well above the 75% saturation criteria in Milner Reservoir during the August 1972 survey. However, the scope of the D.O. measurements was limited as D.O. was only measured at depths up to 10 feet. Sediment oxygen demand is estimated to be 1 mg/l.

As shown in Figure 10 and Figure 11, the BOD_5 concentrations and river loading during the food processing season increased below the Burley food processors during the food processing season. During August 1972, BOD_5 loading and concentrations increased with decreasing river mile below Minidoka Dam, indicating that irrigation returns along with industry and municipalities were contributing to the instream BOD_5.

Aesthetics

Algal blooms have historically occurred during the irrigation season in late summer and early fall in the slow moving reaches of the Snake River and in the impoundments. During the August 1972 survey, scuba divers were employed in American Falls Reservoir for the purpose of obtaining photographs of the aquatic flora and sediments. Unfortunately, algal blooms were so intense that underwater photography could not be used. The blue-green algae, Aphanizomenon flos-aquae, appeared to be the dominant form in the bloom. Secci disk readings of only 18 inches were recorded.

Algal assays by the Provisional Algal Assay Procedure (PAAP) were performed on Upper Snake River water in June 1971, September 1971, and October 1972. Chemical analyses for phosphorus, nitrogen, carbon, and iron were carried out in conjunction with the algal assay tests in order to determine the limiting nutrient in the basin. The maximum productivity by the above PAAP tests and the associated nutrient levels for the waters of Milner Reservoir, American Falls Reservoir, and the Portneuf River for the October 1972 algal assays are shown in Table XII and Figure 12. For comparison, previous algal assays on river waters throughout Region X have generally shown that in waters that do not experience excessive algal productivity, maximum growth by the PAAP test is approximately 5 mg/l dry weight. Thus, the waters of the Upper Snake in these areas are highly productive and the nutrients required for algal growth far exceed threshold levels. In the October

1972 algal assays, phosphorus exceeded threshold levels by such large proportions that the algae did not respond to further additions of phosphorus. Regression analysis of the June 1971 data indicated that phosphorus was the limiting nutrient in the Upper Snake River Basin.

Figure 13 and Figure 14 show total phosphorus and ortho-phosphorus concentrations, respectively, in the Upper Snake River as measured during the October 1971, March 1972, and August 1972 surveys. The three survey curves generally show an increase in phosphorus concentrations as the river flows downstream. The higher concentrations of phosphorus generally occurred during the March 1972 survey, but maximum concentrations in American Falls and Milner Reservoirs occurred during the October 1971 survey. This suggests that phosphorus may be accumulating within the impoundments. Concentrations of total phosphorus were nearly the same during the August and October surveys except for the peak concentrations within the reservoirs. Ortho-phosphorus concentrations were slightly higher during the October survey in and below American Falls Reservoir. River loadings of total and ortho-phosphorus are shown in Figures 15 and 16, respectively, for the October 1971, March 1972, and August 1972 surveys.

Based upon the loading data, it is clear that during periods of normal flow, phosphorus concentrations in the river between Idaho Falls and Milner Dam will be higher during October than during August.

The entire stretch of river from above Idaho Falls to Milner Dam exhibits ortho-phosphorus concentrations above the algal bloom potential threshold of 0.01 mg/l. Also, background levels of ortho-phosphorus as

measured above Idaho Falls during October 1971 and March 1972 and above Roberts, Idaho, during August 1972 were above 0.01 mg/l. Sources of phosphorus above Roberts have not been identified. If the sources of phosphorus above Roberts are mainly natural, 100% removal of phosphorus from all industrial and municipal sources in the Upper Snake River Basin may not reduce ortho-phosphorus concentrations in the river below the algal bloom threshold of 0.01 mg/l.

During the October 1971 survey, total phosphorus concentrations in the bottom sediments averaged 960 mg/g. Sediment samples were taken at five locations between RM 820 and RM 641 with the highest value of 1140 mg/g found in American Falls Reservoir. During the August 1972 survey, total phosphorus in the sediments at two locations in American Falls Reservoir averaged 2150 mg/g. This data further supports the notion that phosphorus accumulates in the reservoir. If anaerobic conditions exist during portions of the year, the sediment phosphorus may be recycled into the water column and become available for algal production. As measured during the August 1972 survey, phosphorus in the interstitial water averaged 1.2 mg/l at the same two locations as the sediment samples. This is well above 0.1 mg/l which is generally accepted as indicative of the presence of euthrophication.

Nitrogen contributes to the algal bloom problem in the Upper Snake River even though it is not considered to be limiting to the algae. Nitrogen data as measured during the October 1971, March 1972, and August 1972 surveys are shown in Tables IX, X and XI, respectively. Nitrate-nitrogen river concentrations and loads are shown in Figures 17 and 18, respectively, for the three surveys. Kjeldahl-nitrogen river concentrations and loads are shown in Figures 19 and 20, respectively, for the October 1971 and March 1972 surveys.

Bacteria

Bacteria data obtained by the State of Idaho, USGS, and EPA show that water quality standards are violated in several stretches of the Snake River, in the Portneuf River, in impoundments of the Snake River, and in the lower reaches of the Teton and Henrys Fork Rivers.

State of Idaho bacteria data obtained periodically over the last three years show that there have been continuous bacteria water quality standard violations in the lower reaches of the Teton and Henrys Fork Rivers. Thirty percent (30%) of the bacteria samples collected in American Falls Reservoir show that standards were violated.

According to USGS data, the bacteria water quality standards have been violated in the Milner Reservoir about 85% of the time since 1968.

Table IX and Table XI show bacteria data for the Upper Snake River and its tributaries for the October 1971 and August 1972 surveys. Total and fecal coliforms vs. river mile are shown in Figures 20 and 22, respectively, for the October 1971 and August 1972 surveys. Water quality standards were exceeded in approximately one-half of the river reach between Idaho Falls and Milner Dam during October 1971. Most of the criteria violations occurred between Idaho Falls and American Falls Reservoir and in Milner Reservoir. During the August 1972 survey, bacteria concentrations were generally lower in the river because the majority of potato processors were not operating. Standards violations during the August 1972 survey occurred only in the stretch of river between Blackfoot and American Falls Reservoir and in Milner Reservoir.

Bacteria contamination did not appear to be excessive in American Falls Reservoir or in the majority of the river between American Falls Reservoir and Burley during the two surveys; however, the levels of bacteria concentrations above American Falls Dam are above what would be expected as a result of known point sources, especially during the food processing season. Therefore, bacterial regrowth apparently was taking place in the nutrient and BOD rich parts of the river. The rate of bacteria regrowth appeared to be greater during the October 1971 survey than during the August 1972 survey. Reduction of waste (BOD and nutrients) concentrations and loads in industrial and municipal effluents may eliminate bacterial regrowth in the river as instream waste levels in the river are reduced.

Total coliforms in the lower reaches of the Portneuf River reached 48,000/100 ml in October 1971, whereas in August 1972 the counts were much lower at 5,000/100 ml. Both of these are standards violations. State of Idaho data since 1969 supports EPA data showing continual violations in the lower reaches of the Portneuf River.

Bacteria standards were violated in Henrys Fork River at St. Anthony with 1100 total coliforms/100 ml during the August 1972 survey. Extensive bacteria sampling of the Henrys Fork and Teton Rivers was beyond the scope of the surveys.

WATER QUALITY PREDICTIONS

Predictions of water quality in the Upper Snake River are presented in this section. The predictions were made through use of a mathematical model of the river. Waste loads that were used included (1) waste loads observed during the EPA surveys of October 1971 and August 1972, and (2) future reduced waste loads. These reduced waste loads specifically include the following:

(a) Best practicable treatment (BPT)

(b) Best available treatment (BAT): 80% phosphorus removal

(c) No discharge of municipal-industrial effluents

These loading conditions were modeled using each of the following river flow conditions for the periods listed:

1. October 1971 - observed flows
2. October 1955 - one in ten year low flow
3. August 1972 - observed flows, one in ten year low flow

The ulitmate objective of the modeling activities was to determine critical stream reaches and periods of the year when dissolved oxygen and total phosphorus were at the lowest and highest concentrations, respectively, for the different loading and flow conditions as stated above.

Mathematical Model

Use -- The mathematical model was used to predict:

1. Nutrient and BOD concentrations in the river
2. D.O. depressions in the river and reservoirs

3. Nutrient and BOD buildup in the reservoirs

4. Possibility of algal productivity

Assumptions -- The assumptions that are inherent in the model are:

1. Background water quality conditions observed during the surveys were used in all prediction calculations. A more accurate prediction of total phosphorus in the river cannot be achieved until phosphorus sources above Idaho Falls are identified as controllable or noncontrollable.

2. Water quality predictions were made both with and without sediment oxygen demand (SOD). The SOD used was determined during the October 1971 survey which probably is higher than future SOD levels.

Modeling Limitations -- Limitations of the model results are as follows:

1. The model simulates water quality conditions only in the river reach from above Idaho Falls to Milner Dam.

2. In reservoirs, the model computes average values based on completely vertically mixed conditions. Thus, stratification of reservoir waters is not considered.

Model Verification -- Model verification runs predicted D.O. concentrations to within $\pm$ 3 mg/l and total phosphorus concentrations to within $\pm$ 0.01 mg/l in the free flowing reaches of the river. Verification in the impoundments was more complex since the model computes average vertically mixed values.

Water Quality with Present Waste Loads

Dissolved Oxygen -- Figure 23 shows predicted D.O. levels for the observed waste loads (Tables II and V) and October 1955 flows. Also, observed D.O. levels during the October 1971 survey are shown for comparison. The October 1955 curve shows that there are constant violations of the 100% D.O. saturation standard above American Falls Reservoir. In and below American Falls Reservoir, the standards appear to be met.

Figure 24 shows river D.O. levels corresponding to the observed waste loadings of the August 1972 survey (one in ten year low flow). The curve shows similar D.O. standards violations as the October D.O. curve (Figure 23) with the exception of the reach between Idaho Falls and Shelley where standards are met.

Total Phosphorus -- Figure 25 shows the predicted total phosphorus concentrations in the river corresponding to observed waste loading and August 1972, October 1955, and October 1971 flows. The curves show that total phosphorus concentrations during the October 1955 flows are nearly twice the concentrations observed during the August 1972 survey. In all cases, total phosphorus levels are predicted to be above algal bloom potential threshold levels.

Water Quality with Future Reduced Waste Loads

Best Practicable Treatment -- Dissolved Oxygen: Figure 26 shows predictions of D.O. levels to BPT, during October 1971 and October 1955 river flows. The curves indicate that there are violations of the 100% saturation standard during both October 1971 and October 1955 flows. In and below American Falls Reservoir, standards are met. Figure 27 is similar to Figure 26 except that August 1972 flows were used in the simulation. Violations of the 100% standards again occur but the magnitude is less. Total Phosphorus: Figure 28 shows total phosphorus levels assuming BPT for flows during August 1972, October 1971, and October 1955. The October 1971 and August 1972 curves show total phosphorus concentrations averaging near 0.05 mg/l. The October 1955 curve show total phosphorus levels to be near 0.1 mg/l. In all cases, total phosphorus levels are above algal bloom potential threshold levels.

Best Available Treatment and No Discharge -- Dissolved Oxygen: Figure 29 shows predicted D.O. levels assuming the conditions of BAT and no discharge of municipal or industrial (M & I) effluents for October 1971 and October 1955 flows. There appears to be little difference between river D.O. levels for the conditions of BAT and no discharge. In both cases, violations of the 100% standard occur above American Falls Reservoir. No violations occur in or below the reservoir. D.O. levels occurring during the October 1971 flows were near 100% saturation above American Falls Reservoir.

Figure 30 shows D.O. levels for August 1972 flows with BAT and no discharge conditions. D.O. levels are very near standards above American Falls Reservoir and above standards in and below the reservoir.

Total phosphorus: Figures 31 and 32 show total phosphorus levels in the river assuming BAT and no discharge conditions for August 1972, October 1971, and October 1955 flows. The levels of total phosphorus predicted by the model in Figures 31 and 32 are questionable with respect to algal productivity as the levels of ortho-phosphorus associated with total phosphorus are unknown for these conditions.

APPENDIX A

TABLE I

UPPER SNAKE RIVER SAMPLING STATION DESCRIPTIONS
August 1972

MAP LOCATION NUMBER	STATION DESCRIPTION	STORET NUMBER	RIVER MILE
1	Snake River at Lorenzo	150056	844.9
2	SF Teton River near Rexburg	150053	837.4/11.1/8.5
3	NR Teton River near Sugar	150054	837.4/20.4/11.8
4	Henry's Fork at St. Ant	150055	837.4/34.9
5	Spring Creek - West of Menan	153328	820.1
6	Snake River - East of Roberts	153299	819.9
7	Golden Valley Packers	153066	816.2
8	Dry Bed Canal - West of Lewisville	153330	815.7
9	Southparks - Lewisville Canal	153331	815.0/1.2
10	Market Lake Canal	153329	813.2
11	NF Willow Creek	153274	801.4/.1
12	Snake River above Idaho Falls	153035	801.2
13	SF Willow Creek	153275	800.7/0.1
14	U&I (Idaho Falls) Outfall	153166	799.2
15	Crow Creek	153276	799.0/.2
16	Idaho Falls STP	153077	797.2
17	Snake River below Idaho Falls	153060	795.0
18	Shelley Outfall (R.T. French)	153171	787.6
19	Shelley STP	153200	787.0
20	Waste Ditch	153277	786.1
21	Snake River at Shelley	153059	785.5
22	Snake River at Firth	153058	780.2
23	Snake River at Blackfoot	153037	763.8
24	Blackfoot STP	153073	762.0
25	Blackfoot River near Mouth	150048	751.2
26	Snake River at Tilden Bridge	150047	751.0
27	Diggie Creek	153278	747.8/.75
28	Jeff Cabin Creek	153279	744.4/1.60
29	McTucker Springs	153281	739.7
30	Snake River at Fort Hall	153291	738.2

TABLE I

UPPER SNAKE RIVER SAMPLING STATION DESCRIPTIONS
August 1972
(Continued)

MAP LOCATION NUMBER	STATION DESCRIPTION	STORET NUMBER	RIVER MILE
31	Spring - 3½ miles SE Springfield *	153294	738.6/.9
32	Spring 12C *	153283	738.4/.3
33	Danielson Creek *	153282	738.5/.1
34	Drain near Sterling *	153285	738.3/.1
35	Spring Creek near Blackfoot *	153280	735.5/5.4
36	Waste Stream near Blackfoot	153293	735.5/11/.2
37	Spring Creek at Bronco Road	153292	735.5/11.25
38	Clear Creek *	153290	738.4/5.05
39	Gibson Drain	153289	738.4/4.25/1.3
40	Ross Fork Creek *	153288	738.4/.01/9.8
41	Portneuf River at Siphon Road *	150038	736.0/11.7
42	Portneuf River at Rowlands	153296	736.0/13.0
43	Pocatello STP	153062	736.0/13.2
44	Spring at Rowlands Dairy	153287	736.0/13.3
45	J.R. Simplot 001	153064	736.0/13.6
46	J.R. Simplot 002	153173	736.0/13.7
47	FMC	153063	736.0/13.7
48	Union Pacific RR	153197	736.0/16.8
49	Portneuf River above Zwigerts	153295	736.0/17.0
50	Bannock Creek *	153286	727/2.5
51	Aberdeen Drain *	153054	726.1/3.6
52	Snake River below American Falls Dam	153016	714.0
53	American Falls STP	153198	713.5
54	Reuger Springs - Hatchery Eff.	153297	712.3
55	Rock Creek	153272	704.1/0.9
56	Snake River near Massacre Rocks	150061	700.75
57	Fall Creek	153271	699.75/0.06
58	Raft River	150034	692.0/1.4
59	Snake River below Minidoka Dam	153270	671.2
60	D3	153231	668.05/0.6

TABLE 1

UPPER SNAKE RIVER SAMPLING STATION DESCRIPTIONS
August 1972
(Continued)

MAP LOCATION NUMBER	STATION DESCRIPTION	STORET NUMBER	RIVER MILE
61	Snake River - 5 miles East of Heyburn	153048	665.1
62	Rupert STP	153083	665.1
63	D4	153232	664.8/0.95
64	D5	153233	663.7/0.3
65	D5C	153234	662.55
66	Marsh Creek	153256	660.42
67	Spring Creek Drain	153255	659.3
68	Rasmussen Drain	153254	658.82/1.3
69	Snake River at Burley-Heyburn Bridge	150031	654.0
70	Goose (Snipe) Creek	153298	653.99
71	J.R. Simplot 001	153071	653.8
72	D16	153235	653.7
73	D7	153236	653.4/0.3
74	Heyburn STP	153084	653.4
75	Burley STP	153070	652.9
76	B-Canal	153269	652.7
77	Snake River at Burley	153047	652.3
78	D12A	153237	652.35/0.5
79	D13	153238	652.0.0.5
80	Morgan Gulch Drain	153245	649.6/0.9
81	Ore-Ida Process	153068	648.7
82	D17	153239	648.30/1.4
83	Main Drain	150057	646.9/1.8
84	J Wasteway	153244	645.30/1.4
85	Snake River at Milner Dam	153001	640.01
86	Main South Side Canal	153266	640.0
87	Main North Side Canal	153267	640.0
88	Milner Gooding Canal	153268	640.0
89	Snake River below Milner Dam	150029	639.7

* Discharge into American Falls Reservoir

TABLE II

AVERAGE POINT SOURCE LOADING 1/
UPPER SNAKE RIVER

October 1971

Discharger 2/	River Mile	BOD_5 mg/l	BOD_5 #/day	NH_3-N mg/l	NH_3-N #/day	NO_2-N mg/l	NO_2-N #/day	NO_3-N mg/l	NO_3-N #/day	KJEL-N mg/l	KJEL-N #/day	TOT-P mg/l	TOT-P #/day	Ortho P mg/l	Ortho P #/day	FLOW Ave cfs
Above American Falls Dam																
Golden Valley Packers	812.6	81.5	200	77.5	200	.012	<.10	.09	<.1	80.1	160	6.70	16	4.60	12.0	.464
Idaho Potato Foods	804.0	1041.0	3,500	30.0	170	.020	0.10	.03	0.1	53.0	290	5.80	30	1.60	10.0	1.08
* Western Farmers	799.6	2132.0	17,700	2.9	24	.193	1.44	7.70	63.9	99.3	825	15.80	131	6.80	49.6	1.55
* Rogers Bros 001	799.3	1103.3	18,046	30.4	497	.010	.20	6.99	114.3	44.4	726	4.90	81	--	--	1.70
* Rogers Bros 002	799.2/0.1	292.5	635	5.4	12	.010	.04	.09	.2	9.7	21	1.70	4	--	--	0.62
U & I Outfall	799.2	121.0	5,300	22.7	1000	.035	1.60	.03	1.1	24.8	1,100	.30	12	.04	2.0	8.20
Idaho Potato Star.	797.9	2090.0	9,000	87.5	390	.027	.10	.02	<.1	204.0	900	33.20	150	24.50	110.0	0.77
Idaho Falls STP	797.2	117.0	5,200	13.7	610	.043	1.90	.05	2.0	18.6	830	6.40	290	4.03	180.0	8.20
R.T. French O.F.	787.6	14.5	140	20.6	190	.063	.60	.28	2.6	28.2	260	3.10	29	2.31	22.0	1.55
Shelley STP	787.0	5.0	6	--	--	--	--	--	--	--	--	--	--	--	--	0.15
Idaho Potato Star.	764.1	1607.5	3,500	69.8	170	.015	<.10	<.01	<.1	134.5	250	18.40	42	6.55	17.0	0.46
* American Potato	761.4	905.0	15,484	11.5	240	.006	.20	12.76	<.1	36.3	658	1.90	31	.55	9.0	3.10
Blackfoot STP	762.0	114.0	650	19.2	110	.026	.20	.04	.2	26.2	150	9.20	52	5.94	33.0	1.08
* FMC	736.0/13.7	4.0	92	.2	5	.003	<.10	1.20	28.0	1.1	25.	5.72	131	6.90	159.0	4.33
* J.R. Simplot 002	736.0/13.7	3.0	8	20.0	50	.380	1.00	.70	2.0	20.0	50	50.00	125	8.00	20.0	0.46
* J.R. Simplot 001	736.0/13.6	3.0	38	35.0	440	4.600	58.00	2.00	25.0	70.0	880	24.00	298	7.00	88.0	2.32
Pocatello STP	736.0/13.2	91.0	3,900	18.1	780	.015	.70	.02	.7	25.3	1,100	8.88	380	6.43	280.0	8.05
* Papoose Springs	736.0/11.6	3.7	2,700	.3	110	<.010	4.00	1.38	550.0	.8	320	.11	44	.10	40.0	74.3
Below American Falls Dam																
Rupert STP	665.1	205.5	2,600	5.7	72	.097	1.20	.02	.3	35.1	440	12.55	160	8.09	100.0	2.32
J.R. Simplot 001	653.8	490.0	20,000	16.2	670	1.820	75	.07	2.8	44.9	1,900	10.70	440	6.33	440.0	7.74
J.R. Simplot 002	653.7	45.5	880	.9	16	.004	<.10	.05	<.1	6.3	120	.84	16	1.04	20.0	3.56
Heyburn STP	653.4	--	--	24.5	26	.250	.30	.23	.2	27.3	29	10.40	6	5.00	5.0	0.155
Burley STP	652.9	24.0	160	6.7	43	.085	.50	.17	1.1	9.5	61	4.30	28	3.65	23.0	1.24
Bryants Meats	649.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ore-Ida 004	649.1	21.0	84	.2	<1	.002	<.10	.04	.2	3.3	16	.83	5	.31	1.0	0.93
Ore-Ida 003	648.9	2.0	10	.1	<1	.080	<.10	2.10	10.5	.2	<1	.02	<1	.05	<1.0	0.93
Ore-Ida 002	648.7	23.5	230	1.2	12	.019	.20	2.97	29.0	3.4	34	1.42	14	1.17	11.0	1.86
Ore-Ida 001	648.7	240.0	7,900	27.6	910	5.123	150.00	.07	<2.1	50.7	1,700	17.10	560	11.30	360.0	6.04
A & P	648.4	61.8	450	1.7	11	.570	3.50	1.05	8.2	5.1	33	.52	3	.07	<1.0	1.24
* Amalgamated Sugar	646.9/8.7	656.0	48,140	110.0	8070	.263	19.00	.27	20.0	178.0	13,000	.60	44	.18	14.0	13.78
Paul STP	646.9/7.2	71.0	54	--	--	--	--	--	--	--	--	--	--	--	--	0.14

1/ Average waste loads taken from RAPP permits or from measured values from October 1971 survey
2/ Grouped by area
3/ Estimated flow

TABLE III

PERCENT CONTRIBUTION OF POINT SOURCES [1]
UPPER SNAKE RIVER
October 1971

Discharger [2]	River Mile	BOD_5	NH_3-N	NO_2-N	NO_3-N	KJEL-N	TOT-P	Ortho-P
Above American Falls Dam								
Golden Valley Packers [3]	812.6	< 1	4	< 1	<1	2	< 1	1
Idaho Potato Foods	804.0	4	3	< 1	<1	3	2	1
* Western Farmers	799.6	21	<1	2	8	9	7	4
* Rogers Bros 001	799.3	21	10	< 1	14	8	4	<1
* Rogers Bros 002	799.2/0.1	< 1	2	< 1	<1	1	<1	<1
U&I Outfall	799.2	6	20	2	<1	13	<1	<1
Idaho Potato Starch	797.9	10	8	< 1	<1	10	8	10
Idaho Falls STP	797.2	6	12	3	<1	10	16	17
R.T. French QF [3]	787.6	< 1	4	< 1	<1	3	2	2
Shelley STP [3]	787.0	< 1	<1	< 1	<1	<1	<1	<1
Idaho Potato Starch	764.1	4	3	< 1	<1	3	2	1
* American Potato	763.4	20	5	< 1	<1	8	2	< 1
Blackfoot STP	762.0	< 1	2	< 1	<1	2	3	3
* FMC	736.0/13.7	< 1	<1	< 1	3	<1	7	15
* J.R. Simplot 002	736.0/13.7	< 1	1	1	<1	<1	7	1
* J.R. Simplot 001	736.0/13.6	< 1	9	82	3	10	16	8
Pocatello STP	736.0/13.2	5	16	1	<1	13	21	27
* Papoose Springs	736.0/11.6	3	2	5	70	4	2	3
		100%	100%	100%	100%	100%	100%	100%
Below American Falls Dam								
Rupert STP	665.1	3	1	< 1	<1	3	13	10
J.R. Simplot 001	653.8	25	7	30	4	11	34	45
J.R. Simplot 002	653.7	1	<1	< 1	<1	<1	1	2
Heyburn STP [3]	653.4	< 1	<1	< 1	<1	<1	< 1	<1
Burley STP	652.9	< 1	<1	< 1	<1	<1	2	2
Bryants Meats	649.9	< 1	<1	< 1	<1	<1	< 1	< 1
Ore-Ida 004	649.1	< 1	<1	< 1	<1	<1	< 1	< 1
Ore-Ida 003	648.9	< 1	<1	< 1	14	<1	< 1	< 1
Ore-Ida 002	648.7	< 1	<1	< 1	39	<1	1	1
Ore-Ida 001 [3]	648.7	10	9	60	<1	10	44	37
A&P	648.4	< 1	<1	1	11	<1	< 1	< 1
* Amalgamated Sugar	646.9/8.7	60	82	8	27	75	3	1
Paul STP [3]	646.9/7.2	< 1	<1	1	<1	<1	< 1	< 1
		100%	100%	100%	100%	100%	100%	100%

1/ Average waste loads taken from RAPP permits or from measured values from October 1971 survey
2/ Grouped by area
3/ Loading from estimated flow

TABLE IV

COLIFORM CONTRIBUTIONS OF POINT SOURCES 1/
UPPER SNAKE RIVER
October 1971 Survey

Discharger	River Mile	Avg Flow MGD	Total Coliform Count/100 ml	Fecal Coliform Count/100 ml	Fecal Streptococci Count/100 ml
Above American Falls Dam					
Golden Valley Packers	812.6	0.3*	200,000	--	--
Idaho Potato Foods	804.0	0.7	8,000,000	7,400	--
Western Farmers	799.6	0.7	2,600,000	--	> 1,000,000
Rogers Bros 001	799.3	1.1	92,000,000	20	25,000
Rogers Bros 002	799.2/0.1	0.4	80,000,000	< 10	41,000
U&I Outfall	799.2	5.2	5,000	< 10	80
Idaho Potato Starch	797.9	0.5	23,000,000	< 10	> 1,000,000
Idaho Falls STP	797.2	5.3	< 1,000	--	< 1,000
R.T. French Outfall	787.6	1.1*	5,400,000	--	930,000
Shelley STP	787.0	0.14*	--	--	--
Idaho Potato Starch	764.1	0.27	280,000	11,000	--
American Potato	763.4	2.0	220,000,000	230,000	--
Blackfoot STP	762.0	0.68	37,000,000	--	2,200,000
FMC	736.0/13.7	2.8	7,000	100	2,700
J.R. Simplot 002	736.0/13.7	0.2	< 1,000	< 100	< 100
J.R. Simplot 001	736.0/13.6	1.3	20,000	< 100	< 100
Pocatello STP	736.0/13.2	5.2	210,000	--	10,000
Papoose Springs	736.0/11.6	40*	--	--	--
Below American Falls Dam					
Rupert STP	665.1	1.5	200,000	< 1,000	--
J.R. Simplot 001	653.8	5.0	6,000,000	--	1,000,000
J.R. Simplot 002	643.7	2.3*	37,000,000	--	620,000
Heyburn STP	653.4	0.13	< 1,000	< 100	< 100
Burley STP	652.9	0.78	< 1,000	< 100	< 100
Bryants Meats	649.9	No data	180	--	50
Ore-Ida 004	649.1	0.59	84,000,000	10	70,000
Ore-Ida 003	648.9	0.62	300	< 100	100
Ore-Ida 002	648.7	1.2	1,700,000	--	45,000
Ore-Ida 001	648.7	3.9*	300,000	--	--
A&P	648.4	0.81	25,000,000	--	710,000
Amalgamated Sugar	646.9/8.7	8.9	320,000	772	110,000
Paul STP	646.9/7.2	0.09*	260,000	--	5,600

1/ The values shown represent the coliform concentrations associated with the maximum Total Coliform values from the October 1971 Survey.

*Estimated flow

TABLE V

AVERAGE POINT SOURCE LOADING
August 1972

Location	River Mile	Flow Ave cfs	BOD5		NO3-N		Tot Phos		Ortho-Phos		Total Coliform	Fecal Coliform
			mg/l	lbs/day	mg/l	lbs/day	mg/l	lbs/day	mg/l	lbs/day	Count/100 mls	Count/100 mls
Above American Falls Dam												
S.F. Teton	837.4/11.1/8.5	580			0.13	41	0.06	190				
N.F. Teton	837.4/20.4/11.8	500			0.18	49	0.04	110			100	30
Henry's Fork	837.4/34.9	2170			0.08	950	0.03	350			1100	10
Spring Cr. 3 miles W. of Menan	820.1	89			0.19	91	0.02	10				
Golden Valley Packers	816.2	0.99	40	215	0.53	5	4.5	24			6500	13600
Dry Bed Canal	815.7	1060			0.10	570	0.03	170				
Southparks Lewisville Canal	815.0/1.2	240			0.05	64	0.04	51				
Market Lake Canal	813.2	65			0.05	2	0.02	7				
N.F. Willow Creek	801.4/0.1	30			0.07	10	0.08	13			3900	860
S.F. Willow Creek	800.7/0.1	9.5			0.07	3	0.05	3			1560	160
I.F. Storm Sewer	799.2	4.7	94	2380	0.24	1	0.94	24			187000	51200
Crow Creek	799.0/0.2	11.4	1.0	59	0.10	7	0.08	5			12700	1100
I.F. STP	797.2	14.7	92	7290	0.10	8	7.7	610			3900	3400
Shelley Outfall (RT French)	787.6	1.1	13	80	0.19	2300	0.08	1			3100	370
Shelley STP	787.0	0.26	16	15	0.28	1	3.5	5			3300	10
Waste Ditch	786.1	150			0.08	69	0.05	40			300	50
Blackfoot STP	762.0	1.6	240	2070	0.10	1	5.9	51	5.3	46	344000	240
Blackfoot River at Mouth	751.2	198	2.7	2870	0.16	170	0.12	130	0.02	22	400	110
Diggie Creek	747.8	100			0.95	540	0.08	43	0.01	5	50	10
Jeff Cabin Creek	744.4	50			0.83	220	0.09	24	0.01	3	220	40
McTucker Springs	739.7	26			1.9	270	0.33	46	0.05	7		
Spring 3½ miles S.E. Springfield	738.6	5			2.0	54	0.08	2			310	40
Spring 12 C	738.4	36			1.6	320	0.26	50	0.04	8	160	10
Danielson Creek	738.5	80			0.5	180	0.10	43	0.02	4	40	10
Drain near Sterling	738.3	27			0.38	56	0.11	16	0.07	10	3400	620
Spring Creek near Blackfoot	735.5/5.4	459	1.0	2480	0.69	1700	0.09	220	0.01	24	70	10
Clear Creek	738.4/5.05	120	1.0	660	0.80	530	0.03	19	0.02	13	310	60
Gibson Drain	738.4/4.25/1.3	20	3	320	0.09	98	0.07	7	0.02	2	120	40
Ross Fork Creek	738.4/0.1/9.8	37	3	600	0.16	40	0.20	40	0.02	4	600	310
Pocatello STP	736.0/13.2	7	120	4520	0.08	3	9.3	350	2.3	86	18000	70
Spring Rowlands Dairy	736.0/13.3	30			1.7	270	0.36	60	0.37	60	50	10
J. R. Simplott 001	736.0/13.6	1.75			2.5	6	14.3	135				
FMC	736.0/13.7	5.15			0.5	14	6.8	190	3.8	106		
J. R. Simplott 002	736.0/13.7	0.57			11.1	3	43.6	130				

TABLE V

AVERAGE POINT SOURCE LOADING
August 1972

Location	River Mile	Flow Ave cfs	BOD_5		NO_3-N		Tot Phos		Ortho-Phos		Total Coliform	Fecal Colif.
			mg/l	lbs/day	mg/l	lbs/day	mg/l	lbs/day	mg/l	lbs/day	Count/100 mls	Count/100 mls
Union Pacific RR	736.0/16.8	0.36	16	30	0.9	17	1.7	3	0.48	1	109000	5030
Bannock Creek	727.0	41			0.16	32	0.15	33	0.22	48	1400	290
Aberdeen Drain	726.1	30	6	970	0.38	56	0.09	14	0.15	25	52000	6300
Below American Falls Dam												
American Falls STP	713.5	1.0	3.3	180	0.46	2	6.7	36	7.4	40	29000	13000
Reuger Hatchery Effluent	712.3	19	2.0	205	0.73	80	0.11	11	0.08	8	2500	10
Rock Creek	704.1	15			0.68	60	0.08	6	0.03	2	230	60
Fall Creek	699.75	21			0.14	16	0.02	2			390	50
Raft River	692.0	3			1.7	28	0.08	1			530	80
D 3	668.05	4.7			1.2	30	0.11	3	0.10	3	200	10
Rupert STP	665.1	3.6	25	480	0.25	48	5.2	100	4.2	82	40	10
D 4	664.8	4.3			2.7	63	0.16	3	0.12	3	14000	
D 5	663.7	16			0.41	35	0.09	8	0.06	5	900	
D 5C	662.55	0.5			0.47	1	0.16	1	0.12	1	300	
Marsh Creek	640.42	25			2.4	320	0.21	28	0.14	19	14000	
Spring Creek Drain	659.3	12					0.18	12	0.11	7	1700	
Rassmussen Drain	658.82	1.8			3.7	36	0.18	2	0.13	1	12500	
Goose Creek	653.99	19.4	2	180	4.4	320	0.15	16	0.10	9	1700	180
J. R. Simplott Process	653.8	7.5	74	4270	5.3	210	4.7	190	2.2	93	5,700,000	213000
D 16	653.7	19			0.88	90	0.16	16	0.12	12	450	
D 7	653.4	0.83			0.93	5	0.14	1	0.10	1	500	
Heyburn STP	653.4	0.28	110	280	0.17	1	7.2	11	4.8	17	2,800,000	26000
Burley STP	652.9	1.6	25	170	0.13	2	4.9	42	3.6	21	670	340
B-Canal	652.7	26	2	290	0.15	21	0.08	11	0.04	5	730	10
D 12A	652.29	17			1.1	100	0.13	12	0.09	8	650	
D 13	652.0	1.5			0.20	2	0.14	1	0.09	1	700	
Morgan Gulch Drain	649.6	3			0.32	5	0.3	5	0.16	3	900	
ORE-IDA Process	648.7	6.6	40	1420	46.0	30	10.5	370	7.5	270	375000	1000
D 17	648.3	10.6			2.0	110	0.13	7	0.05	3	1200	
Main Drain	646.9	18	5	480	0.75	75	0.22	21	0.12	13	36000	34000
J Wasteway	545.3	23			0.16	20	0.10	12	0.03	4	1000	

TOTAL PHOSPHOROUS POINT SOURCE CONTRIBUTIONS
- August 1972 -

SOURCE	RIVER MILE	FLOW Ave cfs	mg/l	lbs/day	PERCENT CONTRIBUTIONS
Irrigation & Tributaries					
South Fork Teton	837.4/11.1/8.5	580	0.06	190	*
North Fork Teton	837.4/20.4/11.8	500	0.04	110	*
Henry's Fork	837.4/34.9	2170	0.03	350	*
Spring Creek W. of Menan	820.1	89	0.02	10	< 0.5
Dry Bed Canal W. of Lewisville	815.7	1060	0.03	170	4
Southparks-Lewisville Canal	815.0/1.2	239	0.04	51	1.0
Market Lake Canal	813.2	65	0.02	7	< 0.5
North Fork Willow Creek	801.4/.1	30	0.08	13	0.5
South Fork Willow Creek	800.7/.1	9.5	0.05	3	< 0.5
Crow Creek	799.0/.2	11.4	0.08	5	< 0.5
Waste Ditch	786.1	150	0.05	40	1.0
Blackfoot River near Mouth	751.2	198	0.12	130	3.0
Diggie Creek	747.8/.75	100	0.02	43	1.0
Jeff Cabin Creek	744.4/1.6	50	0.09	24	0.5
McTucker Springs	739.7	26	0.33	46	1.0
Spring - 3½ miles SE of Springfield	738.6/.9	5	0.08	2	< 0.5
Spring 12C	738.4/.3	36	0.26	50	1.0
Danielson Creek	738.5/.1	80	0.10	43	1.0
Drain near Sterling	738.3/.1	27	0.11	16	0.5
Spring Creek near Blackfoot	735.5/5.4	459	0.09	220	5.5
Clear Creek	738.4/5.05	120	0.03	19	0.5
Gibson Drain	738.4/4.25/1.3	20	0.07	7	< 0.5
Ross Fork Creek	738.4/.01/9.8	37	0.20	40	1.0
Portneuf River at Syphon Road	736/11.7	180	0.81	786	*
Portneuf River at Rowlands	736/13.0	180	0.68	660	*
Spring at Rowlands Dairy	736/13.3	30	0.36	58	1.5
Portneuf River above Zwiegerts	736/17	180	0.14	135	*
Bannock Creek	727/2.5	41	0.15	33	1.0
Aberdeen Drain	726.1/3.6	30	0.09	14	0.5
Rock Creek	704.1/0.9	15	0.08	6	< 0.5

TABLE 12

TOTAL PHOSPHOROUS POINT SOURCE CONTRIBUTIONS
August 1972
(Continued)

SOURCE	RIVER MILE	FLOW Ave cfs	mg/l	lbs/day	PERCENT CONTRIBUTIONS
Fall Creek	699.75/.06	21	0.02	2	<0.5
Raft River	692.0/1.4	3	0.08	1	<0.5
D3	668.05/0.6	4.7	0.11	3	<0.5
D4	664.8/0.95	4.3	0.16	3	<0.5
D5	663.7/0.3	16	0.09	8	<0.5
D5C	662.55	0.5	0.16	<1	<0.5
Marsh Creek	660.42	25	0.21	28	0.5
Spring Creek Drain	659.3	12	0.18	12	<0.5
Rasmussen Drain	658.82/1.3	1.8	0.18	2	<0.5
Goose (Snipe) Creek	653.99	19.4	0.15	16	0.5
D16	653.7	19	0.16	16	0.5
D7	653.4/0.3	.83	0.14	<1	<0.5
B-Canal	652.7	26	0.08	11	<0.5
D12A	652.35/0.5	17	0.13	12	<0.5
D13	652.0/0.5	1.5	0.14	1	<0.5
Morgan Gulch Drain	649.61/0.9	3	0.3	5	<0.5
D17	648.30/3.5	10.6	0.13	7	<0.5
Main Drain	646.9/1.8	18	0.22	21	0.5
J Wasteway	645.30/1.4	23	0.10	12	<0.5
Estimated Loading-Unsampled Sources Into American Falls Reservoir					
Big Jimmy Creek		26	0.05	7	<0.5
Ford Creek		6	0.05	2	<0.5
Kinney Creek		28	0.05	8	<0.5
Wide Creek		47	0.05	13	<0.5
Pyle Springs		7	0.10	4	<0.5
Hull Springs		8	0.10	4	<0.5
Tanner Springs		1	0.10	<1	<0.5
		2	0.08	1	<0.5

- TOTAL PHOSPHOROUS POINT SOURCE CONTRIBUTIONS
August 1972
(Continued)

SOURCE	RIVER MILE	FLOW Ave cfs	mg/l	lbs/day	PERCENT CONTRIBUTIONS
Municipal					
Idaho Falls Storm Sewer (U&I Outfall)	799.2	4.7	0.94	24	0.5
Idaho Falls STP	797.2	14.7	7.7	610	15.0
Shelley Outfall (R.T. French)	787.6	1.1	0.08	1	$\leq$ 0.5
Shelley STP	787.0	0.26	3.5	5	$\leq$ 0.5
Blackfoot STP	762.0	1.6	5.9	51	1.5
Pocatello STP	736.0/13.2	7.0	9.3	350	8.5
American Falls STP	713.5	1.0	6.7	36	1.0
Rupert STP	665.1	3.6	5.2	101	2.5
Heyburn STP	653.4	0.28	7.2	11	$\leq$ 0.5
Burley STP	652.9	1.6	4.9	42	1.0
					30%
Industrial					
Golden Valley Packers	816.2	0.99	4.5	24	0.5
J.R. Simplot 001 - Poc	736.0/13.6	1.75	14.3	135	3.5
J.R. Simplot 002 - Poc	736.0/13.7	0.57	43.6	134	3.5
FMC	736.0/13.7	5.15	6.8	189	4.5
Union Poc. R.R.	736.0/16.8	0.36	1.7	3	$\leq$ 0.5
Rueger Springs - Hatchery Eff.	712.3	19	0.11	11	$\leq$ 0.5
J.R. Simplot 001 - Bur	653.8	7.5	4.7	190	4.5
Ore-Ida Process	648.7	6.6	10.5	373	9.0
					26%
Summary					
Irrigation & Tributaries				1760	44
Municipal				1230	30
Industrial				1060	26
				4050	100%

TABLE VI

TOTAL PHOSPHOROUS POINT SOURCE CONTRIBUTIONS
August 1972
(Continued)

SOURCE	RIVER MILE	FLOW Ave cfs	mg/l	lbs/day	PERCENT CONTRIBUTIONS
Crystal Waste		16	0.08	7	< 0.5
Artesidan Springs		3	0.10	2	< 0.5
Colburn Waste		2	0.08	1	< 0.5
Tartar Waste		12	0.08	5	< 0.5
Schlitz Waste		4	0.08	2	< 0.5
Cedar Waste		22	0.08	9	< 0.5
Triple Creek		20	0.05	5	< 0.5
Fort Hall Michaud Canal		77	0.03	12	< 0.5
Unmeasured Inflow		1300	0.05	350	8.5
Into Snake River Above American Falls Res.					
Parsons Ditch		48	0.08	21	0.5
Weary Rick Ditch		55	0.08	24	0.5
Wattson Ditch		102	0.08	44	1.0
Trego Ditch		56	0.08	24	0.5
					44%

* Not included in point source total phosphorous percent contributions.

NOTE: Inconsistancies may be due to rounding.

TABLE VII

SUMMARY TOTAL PHOSPHOROUS - PERCENT CONTRIBUTIONS
October 1971

SOURCE	LBS/DAY	PERCENT CONTRIBUTION
Above Idaho Falls to American Falls Dam		
Industrial *	1020	34
Municipal	730	25
Tributaries **	340	11
Snake River above IF Power House	880	30
	2970	100%
American Falls Dam to Milner Dam		
Industrial	1070	21
Municipal	230	4
Snake River below American Falls	3960	75
	5260	100%
Above Idaho Falls to Milner Dam		
Industrial *	2100	49
Municipal	960	22
Tributaries **	340	8
Snake River above IF Power House	880	21
	4280	100%

* Not including Golden Valley Packers
** Blackfoot River, Aberdeen Drain

TABLE VIII

SUMMARY TOTAL PHOSPHOROUS - PERCENT CONTRIBUTIONS
August 1972

SOURCE	LBS/DAY	PERCENT CONTRIBUTION
Lorenzo to American Falls Dam		
Industrial	490	10
Municipal	1040	22
Irrigation and Tributaries	1590	33
NF & SF Teton, Henry's Fork	650	14
Snake River at Lorenzo	980	21
	4750	100%
American Falls Dam to Milner Dam		
Industrial	570	11
Municipal	190	4
Irrigation and Tributaries	170	3
Snake River below American Falls	4260	82
	5190	100%
Lorenzo to Milner Dam		
Industrial	1060	19
Municipal	1230	22
Irrigation and Tributaries	1760	31
NF & SF Teton, Henry's Fork	650	11
Snake River At Lorenzo	980	17
	5680	100%

TABLE IX

OCTOBER 1971 SURVEY DATA

Location	River Mile	Flow Ave cfs	BOD_5 mg/l	BOD_5 #/day	NO_3 mg/l	NO_3 #/day	Kjeld-N mg/l	Kjeld-N #/day	t-p mg/l	t-p #/day	o-p mg/l	o-p #/day	Total Coliform Count/100mls	Fecal Coliform Count/100mls	Fecal Streptococ Count/100m
ake River near Blackfoot	764.0	9,900	1.0	53,400	0.05	2,510	0.8	43,100	0.03	1,410	0.01	770	24,000	180	5,80
ake River at Blackfoot	763.8	9,900	1.0	53,400	0.04	2,360	0.42	22,700	0.03	1,480	0.02	820	36,000	60	2,80
American Potato	763.4	3.1	905	15,500	0.004	0.1	38	660	1.9	31	0.55	9	220,000,000	230,000	—
Blackfoot STP	762.0	1.1	115	650	0.04	0.2	26	150	9.2	52	6.0	33	37,000,000	—	2,200,00
ake River 5 miles above Tilden Brdg	755.6	9,900	1.0	53,400	0.04	2,290	0.8	43,100	0.04	1,930	0.01	740	17,000	83	12
Blackfoot River near Mouth	751.2	290	1.0	1,560	0.10	160	0.90	1,410	0.16	250	0.03	47	3,200	50	40
ake River at Tilden Bridge	751.0	10,150	1.0	54,800	0.06	3,120	0.5	27,400	0.04	2,140	0.01	810	36,000	440	1,30
ake River 6 miles below Tilden Brdg	745.0	10,150	1.0	54,800	0.16	8,760	0.55	30,100	0.04	2,210	0.02	900	17,000	83	12
Papoose Springs	736.0/11.6	74.3	3.7	2,700	1.4	550	0.8	320	0.11	44	0.10	40	—	—	—
Portneuf River at Siphon Rd Brdg	736.0/11.7	390	1.2	2,520	1.2	2,520	1.2	2,520	0.29	610	0.21	440	21,000	270	53
Pocatello STP	736.0/13.2	8.05	91	3,900	0.02	0.7	25	1,100	8.9	380	6.4	280	210,000	—	10,00
Portneuf R. above Poc. STP	736.0/13.5	390	1.0	2,100	0.77	1,620	0.95	2,000	0.22	460	0.12	250	18,000	130	11
J.R. Simplot 001	736.0/13.6	2.3	3	38	2	25	70	880	24	300	7	88	20,000	⩽100	⩽10
J.R. Simplot 002	736.0/13.7	0.46	3	8	0.7	2	20	50	50	125	8	20	⩽1,000	⩽100	⩽10
FMC	736.0/13.7	4.3	4	92	1.2	28	1.1	25	5.7	130	6.9	160	7,000	100	2,70
Portneuf R. at Portneuf	736.0/22.0	390	1.0	2,100	0.73	1,530	0.82	1,720	0.09	190	0.44	920	1,600	120	31
Aberdeen Drain	726.1	8.5	72	3,300	0.61	28	5.5	250	2.0	92	0.79	36	24,000,000	20,000	2,800,00
ake River (American Falls Reservoir)	725.0	12,100	1.1	71,700	0.10	6,520	0.85	55,400	0.14	9,100	0.05	3,260	62	4	
ake River (American Falls Reservoir)	714.4	12,100	1.0	65,400	0.07	4,560	0.79	51,500	0.05	3,260	0.03	1,950	45	3	
ake River below American Falls Dam	714.0	12,100	1.0	65,400	0.10	6,310	0.70	45,800	0.06	3,960	0.03	2,010	2,600	4	1
ake River near Massacre Rocks	699.0	12,100	1.0	65,400	0.12	7,760	0.75	49,100	0.05	3,300	0.03	2,040	920	50	2
ake River below Minidoka Dam	674.9	12,400	1.0	68,000	0.11	7,040	0.65	43,600	0.06	3,750	0.02	1,640	660	90	7
ake River 5 miles East of Heyburn	665.1	12,400	1.0	67,000	0.15	9,960	0.65	43,600	0.06	4,030	0.02	1,620	640	16	9
Rupert STP	665.1	2.3	205	2,600	0.02	0.3	35	440	12.5	160	8.1	100	200,000	⩽1,000	—

(Continued)

TABLE IX

OCTOBER 1971 SURVEY DATA

Location	River Mile	Flow Ave cfs	BOD_5 mg/l	BOD_5 #/day	NO_3 mg/l	NO_3 #/day	Kjeld-N mg/l	Kjeld-N #/day	t-p mg/l	t-p #/day	o-p mg/l	o-p #/day	Total Coliform Count/100mls	Total Coliform Count/100mls	Fecal Streptococci Count/100mls
Snake River at Burley-Heyburn Bridge	654.0	12,400	1.0	67,000	0.46	31,200	0.63	41,800	0.06	4,180	0.03	1,870	500	28	49
J.R. Simplot 001	653.8	7.7	490	20,000	0.07	2.8	45	1,900	10.7	440	6.3	440	6,000,000	—	1,000,000
J.R. Simplot 002	653.7	3.6	45	880	0.05	< 0.1	6.3	120	0.8	16	1.0	20	37,000,000	—	620,000
Heyburn STP	653.4	0.15	—	—	0.25	0.2	27	29	10.4	8	5.0	5	< 1,000	< 100	< 100
Burley STP	652.9	1.2	24	160	0.17	1.1	9.5	61	4.3	28	3.6	23	< 1,000	< 100	< 100
Snake River at Burley	652.3	12,400	—	—	0.11	11,500	0.95	63,700	0.08	5,130	0.03	2,180	19,000	15	980
Snake River below Custer Island	650.5	12,400	2.7	184,000	0.48	32,800	1.0	68,800	0.11	7,530	0.06	3,890	84,000	240	8,200
Ore-Ida 004	649.1	0.93	21	84	0.04	0.2	3.3	16	0.83	5	0.31	1.0	84,000,000	< 10	70,000
Ore-Ida 003	648.9	0.93	2	10	2.1	10.5	0.2	< 1.0	0.02	< 1.0	0.05	< 1.0	300	100	100
Ore-Ida 002	648.7	1.9	24	230	3.0	29	3.4	34	1.4	14	1.2	11	1,700,000	—	45,000
Ore-Ida 001	648.7	6.0	240	7,900	0.0	< 2	51	1,700	17	560	11.3	360	300,000	—	—
A&P	648.4	1.2	62	450	1.1	8	5.1	33	0.5	3	0.07	< 1	25,000,000	—	710,000
Snake River below Ore-Ida	647.2	12,400	2.8	191,000	0.7	48,600	1.3	83,800	0.18	11,800	0.11	7,090	270,000	85	31,000
Main Drain	646.9/1.8	16.6	180	16,100	0.1	13	6.9	620	0.41	37	0.16	14	47,000,000	44,000	430,000
Paul STP	646.9/7.2	0.14	71	54	—	—	—	—	—	—	—	—	260,000	—	5,600
Amalgamated Sugar	646.9/8.7	13.8	660	48,100	0.3	20	180	13,000	0.6	44	0.18	14	320,000	772	110,000
Snake River above Milner Dam	640.01	12,400	1.7	117,000	0.1	10,700	1.0	67,300	0.07	4,890	0.03	1,910	240,000	460	1,300
Snake River below Milner Dam	639.7	10,700	—	—	0.1	8,650	0.50	28,800	0.07	4,035	0.03	1,730	>80,000	100	1,700

NOTE: Inconsistancies may be due to rounding.

(Continued)

TABLE IX

OCTOBER 1971 SURVEY DATA

Location	River Mile	Flow Aye cfs	BOD_5 mg/l	BOD_5 #/day	NO_3 mg/l	NO_3 #/day	Kjeld-N mg/l	Kjeld-N #/day	t-p mg/l	t-p #/day	o-p mg/l	o-p #/day	Total Coliform Count/100mls	Fecal Coliform Count/100mls	Fecal Streptococci Count/100mls
Golden Valley Packers	812.6	0.46	81.5	200	0.09	0.1	80.1	160	6.70	16	4.60	12.0	200,000	—	—
ake River above IF Power Plant	804.7	9,540	1.0	51,500	0.05	2,490	0.37	19,300	0.02	880	0.01	560	170	13	20
Idaho Potato Foods	804.0	1.1	1,040	3,500	0.03	0.1	53	290	5.80	30	1.60	10	8,000,000	7,400	—
ake River at Grandview Dr (IF)	801.2	9,540	1.0	51,500	0.05	2,470	0.35	18,000	0.02	960	0.01	550	310	12	92
ake River at Broadway Bridge (IF)	799.9	9,540	1.0	50,600	0.05	2,350	0.42	21,900	0.02	1,040	0.01	570	460	13	220
Western Farmers	799.6	1.5	2,130	17,700	7.7	64	99	820	15.8	130	6.8	50	2,600,460	—	71,000,000
Idaho Falls Storm Sewer (I&I Outfall)	799.4	8.2	120	5,300	0.03	1.1	25	1,100	0.3	12	0.04	2	5,000	10	80
Rogers Bros 001	799.3	1.7	1,100	18,000	7.0	110	44	730	4.9	80	—	—	92,000,000	20	25,000
ake River at 17th St. Bridge (IF)	799.25	9,540	1.0	51,500	0.05	2,570	0.45	23,200	0.03	1,310	0.01	740	550	10	410
Rogers Bros 002	799.2/0.1	0.62	290	630	0.09	0.2	9.7	21	1.7	4	--	--	80,000,000	10	41,000
Idaho Potato Starch	797.9	0.77	2,100	9,000	0.02	0.1	200	900	33	150	24	110	23,000,000	10	1,000,000
Idaho Falls STP	797.2	8.2	120	5,200	0.05	2	18.6	830	6.4	290	4.0	180	< 1,000	--	< 1,000
ake River below Ida Pot Starch	795.0	9,540	1.2	61,100	0.04	2,040	0.50	25,500	0.02	1,020	0.01	510	260,000	42	1,000
ake River near Shelley (Bennett Brdg)	792.3	9,540	1.0	50,600	0.04	2,300	0.52	27,000	0.03	1,470	0.01	690	34,000	87	42
Shelley Storm Sewer (R.T. French Outfall)	787.6	1.55	15	140	0.28	2.6	28.2	260	3.1	29	2.3	22	5,400,000	—	930,000
Shelley STP	787.0	0.15	5	6	—	—	—	—	—	—	—	—	—	—	—
ake River West of Shelley	785.5	9,540	1.0	51,500	0.04	2,280	0.42	21,900	0.02	1,200	0.01	600	31,000	98	1,700
ake River at Firth	780.2	9,540	1.0	51,500	0.04	2,200	0.42	21,800	0.03	1,360	0.01	670	83,000	57	7
ake River above Blackfoot	764.7	9,900	1.0	53,400	0.05	2,410	0.55	29,400	0.03	1,440	0.01	720	22,000	77	5,300
Idaho Potato Starch	764.1	0.46	1,610	3,500	<0.01	<0.1	130	250	18	42	6.5	17	280,000	11,000	—

TABLE X

March 1972 Survey Data

Location	River Mile	Flow (cfs)	NO_3-N mg/l	NO_3-N lb/day	Kjeldahl-N mg/l	Kjeldahl-N lb/day	Total-P mg/l	Total-P lb/day	Ortho-P mg/l	Ortho-P lb/day
Snake River above IF Power Plant	804.7	9,550	0.22	11,300	0.9	46,300	0.04	2,060	0.01	510
Snake River at Tilden Bridge	751.0	10,000	0.26	14,000	0.5	26,900	0.10	5,390	0.02	1,080
Snake River below American Falls Dam	714.0	4,500	0.39	9,450	0.6	14,500	0.11	2,670	0.04	970
Snake River below Minidoka Dam	674.9	3,980	0.35	7,500	0.7	15,000	0.11	2,360	0.05	1,070
Snake River below Milner Dam	639.7	5,520	0.47	14,000	0.80	23,800	0.15	4,460	0.07	2,080

TABLE XI

AUGUST 1972 SURVEY DATA

Location	River Mile	Flow Ave cfs	BOD_5		NO_3-N		Tot Phos		Ortho-Phos		Total Coliform	Fecal Coliform
			mg/l	lbs/day	mg/l	lbs/day	mg/l	lbs/day	mg/l	lbs/day	Count/100 mls	Count/100 mls
Above American Falls Dam												
Snake River at Lorenzo	844.9	9100			0.05	2460	0.02	980			10	10
S.F. Teton	837.4/11.1/8.5	580			0.13	41	0.06	190				
N.F. Teton	837.4/20.4/11.8	500			0.18	49	0.04	110			100	30
Henry's Fork	837.4/34.9	2170			0.08	950	0.03	350			1100	10
Spring Cr. 3 miles W. of Menan	820.1	89			0.19	91	0.02	10				
Snake R. 2 miles E. of Roberts	819.9	11320			0.18	13700	0.03	1830	0.02	1230	60	10
Golden Valley Packers	816.2	0.99	40	215	0.53	5	4.5	24			6600	13600
Dry Bed Canal	815.7	1060			0.10	570	0.03	170				
Southparks Lewisville Canal	815.0/1.2	240			0.05	64	0.04	51				
Market Lake Canal	813.2	65			0.05	2	0.02	7				
N.F. Willow Creek	801.4/0.1	30			0.07	10	0.08	13			3900	860
Snake R. above I.F. at Grandview	801.2	5350	1.0	28,900	0.08	2400	0.04	1150			100	20
S.F. Willow Creek	800.7/0.1	9.5			0.07	3	0.05	3			1560	160
I.F. Storm Sewer	799.2	4.7	94	2380	0.24	1	0.94	24			187000	51200
Crow Creek	799.0/0.2	11.4	1.0	59	0.10	7	0.08	5			12700	1100
I.F. STP	797.2	14.7	92	7290	0.10	8	7.7	610			3900	3400
Snake River below I.F.	795.0	5350	2.0	57700	0.09	2310	0.04	1150			530	10
Shelley Outfall (RT French)	787.6	1.1	13	80	0.19	2300	0.08	1			3100	370
Shelley STP	787.0	0.26	16	15	0.28	1	3.5	5			3300	10
Waste Ditch	786.1	150			0.08	69	0.05	40			300	50
Snake River at Shelley	785.5	5350	2.0	58100	0.07	2030	0.05	1440			280	10
Snake River at Firth	780.2	5350	2.0	58900	0.08	2320	0.06	1730			280	10

TABLE XI

AUGUST 1972 SURVEY DATA

Location	River Mile	Flow Ave cfs	BOD5		NO3-N		Tot Phos		Ortho-Phos		Total Coliform	Fecal Coliform
			mg/l	lbs/day	mg/l	lbs/day	mg/l	lbs/day	mg/l	lbs/day	Count/100 mls	Count/100 mls
Snake River at Blackfoot	763.8	3760	1.7	34600	0.07	1370	0.04	810	0.01	201	700	40
Blackfoot STP	762.0	1.6	240	2070	0.10	1	5.9	51	5.3	46	344000	240
Blackfoot River at Mouth	751.2	198	2.7	2870	0.16	170	0.12	130	0.02	2[illegible]	400	110
Snake River at Tilden Bridge	751.2	3950	1.7	37100	0.14	2790	0.065	1380	0.02	400	3800	30
Diggie Creek	747.8	100			0.95	540	0.08	43	0.01	5	50	10
Jeff Cabin Creek	744.4	50			0.83	220	0.09	24	0.01	3	220	40
McTucker Springs	739.7	26			1.9	270	0.33	46	0.05	7		
Snake River at Fort Hall	738.2	4150	1.0	33400	0.20	6780	0.06	1340	0.02	680	4500	250
Spring 3½ miles S.E. Springfield	738.6	5			2.0	54	0.08	2			310	40
Spring 12 C	738.4	36			1.6	320	0.26	50	0.04	8	160	10
Danielson Creek	738.5	80			0.5	180	0.10	43	0.02	4	40	10
Drain near Sterling	738.3	27			0.38	56	0.11	16	0.07	10	3400	620
Spring Creek near Blackfoot	735.5/5.4	459	1.	2480	0.69	1700	0.09	220	0.01	24	70	10
Waste Stream	735.5/11/0.2	9			0.13	6	0.63		0.03	1	110	20
Spring Creek at Bronco Rd.	735.5/11.25	450			0.82	2000	0.02		0.02	36	20	10
Clear Creek	738.4/5.05	120	1.0	660	0.80	530	0.03	19	0.02	13	310	60
Gibson Drain	738.4/4.25/1.3	20	3	320	0.09	98	0.07	7	0.02	2	120	40
Ross Fork Creek	738.4/0.1/9.8	37	3	600	0.16	40	0.20	40	0.02	4	600	310
Portneuf at Syphon Road	736.0/11.7	180	4	3910	0.98	890	0.81	790	1.06	1670	3800	400
Portneuf at Rowland Dairy	736.0/13.0	180	2	2900	1.1	1180	0.68	660	0.50	490	5030	410
Pocatello STP	736.0/13.2	7	120	4520	0.08	3	9.3	350	2.3	86	18000	70
Spring Rowlands Dairy	736.0/13.3	30			1.7	270	0.36	60	0.37	60	50	10
J. R. Simplott 001	736.0/13.6	1.75			2.5	6	14.3	135				
FMC	736.0/13.7	5.15			0.5	14	6.8	190	3.8	106		
J. R. Simplott 002	736.0/13.7	0.57			11.1	3	43.6	130				
Union Pacific RR	736.0/16.8	0.36	16	30	0.9	17	1.7	3	0.48	1	109000	5030
Portneuf R. above Zwigerts	736.0/17.0	180	1.8	1730	0.46	460	0.14	135	0.03	8[illegible]	2800	630
Bannock Creek	727.0	41			0.16	32	0.15	33	0.22	48	1400	290
Aberdeen Drain	726.1	30	6	970	0.38	56	0.09	14	0.15	25	52000	6300

TABLE XI

AUGUST 1972 SURVEY DATA

Location	River Mile	Flow Ave cfs	BOD_5		NO_3-N		Tot Phos		Ortho-Phos		Total Coliform	Fecal Coliform
			mg/l	lbs/day	mg/l	lbs/day	mg/l	lbs/day	mg/l	lbs/day	Count/100 mls	Count/100 mls
Below American Falls Dam												
Snake River below American Falls	714.0	11300	4.7	28600	0.07	4540	0.07	4260	0.02	1515	50	10
American Falls STP	713.5	1.0	3.3	180	0.46	2	6.7	36	7.4	40	29000	13000
Reuger Hatchery Effluent	712.3	19	2.0	205	0.73	80	0.11	11	0.08	8	2500	10
Rock Creek	704.1	15			0.68	60	0.08	6	0.03	2	230	60
Snake River near Massacre Rocks	700.75	11300	2.5	153000	0.07	4570	0.06	3650	0.02	1220	80	10
Fall Creek	699.75	21			0.14	16	0.02	2			390	50
Raft River	692.0	3			1.7	28	0.08	1			530	80
Snake R. 4 miles below Minidoka	671.2	9160	1.0	49400	0.1	4940	0.05	2470	0.02	990	10	10
D 3	668.05	4.7			1.2	30	0.11	3	0.10	3	200	10
Snake R. 5 miles E. of Heyburn	665.1	9160	1.7	82400	0.07	3290	0.06	2960	0.02	1150	30	10
Rupert STP	665.1	3.6	25	480	0.25	48	5.2	100	4.2	82	40	10
D 4	664.8	4.3			2.7	63	0.16	3	0.12	3	14000	
D 5	663.7	16			0.41	35	0.09	8	0.06	5	900	
D 5C	662.55	0.5			0.47	1	0.16	1	0.12	1	300	
Marsh Creek	640.42	25			2.4	320	0.21	28	0.14	19	14000	
Spring Creek Drain	659.3	12					0.18	12	0.11	7	1700	
Rassmussen Drain	658.82	1.8			3.7	36	0.18	2	0.13	1	12500	
Snake R. at Burley Heyburn Bridge	654.0	9160	1.5	74200	0.07	3700	0.03		0.02	990	35	10
Goose Creek	653.99	19.4	2	180	4.4	320	0.15	16	0.10	9	1700	180
J. R. Simplott Process	653.8	7.5	74	4270	5.3	210	4.7	190	2.2	93	5,700,000	213000
D 16	653.7	19			0.88	90	0.16	16	0.12	12	450	
D 7	653.4	0.83			0.93	5	0.14	1	0.10	1	500	
Heyburn STP	653.4	0.28	110	280	0.17	1	7.2	11	4.8	17	2,800,000	26000
Burley STP	652.9	1.6	25	170	0.13	2	4.9	42	3.6	21	670	340
B-Canal	652.7	26	2	290	0.15	21	0.08	11	0.04	5	730	10

TABLE XI

AUGUST 1972 SURVEY DATA

Location	River Mile	Flow Ave cfs	BOD_5		NO_3-N		Tot Phos		Ortho-Phos		Total Coliform	Fecal Colif.
			mg/l	lbs/day	mg/l	lbs/day	mg/l	lbs/day	mg/l	lbs/day	Count/100 mls	Count/100mls
Snake River at Burley	652.3	9160	2	98,800	0.08	3790	0.06	2960	0.02	820	450	26000
D 12A	652.29	17			1.1	100	0.13	12	0.09	8	650	
D 13	652.0	1.5			0.20	2	0.14	1	0.09	1	700	
Morgan Gulch Drain	649.6	3			0.32	5	0.3	5	0.16	3	900	
ORE-IDA Process	648.7	6.6	40	1420	46.0	30	10.5	370	7.5	270	375000	1000
D 17	648.3	10.6			2.0	110	0.13	7	0.05	3	1200	
Main Drain	646.9	18	5	480	0.75	75	0.22	21	0.12	13	36000	34000
J Wasteway	545.3	23			0.16	20	0.10	12	0.03	4	1000	
Snake River at Milner	640.01	9400	2	118000	0.07	3380	0.07	3540	0.02	840	1340	40
Main South Side Canal	640.0	3520			0.10	1920	0.07	1330	0.02	380		
Main North Side Canal	640.0	3810			0.10	2050	0.08	1640	0.02	410		
Milner Gooding Canal	640.0	1580			0.10	850	0.08	680	0.02	170		
Snake River below Milner	639.7	450			0.07	160	0.08	190	0.02	50	1400	20

TABLE XII

UPPER SNAKE RIVER ALGAL ASSAY DATA

October 1972

	Maximum Productivity mg/l dry weight	Ortho P mg/l	Total P mg/l	Kjel-N mg/l	NO_3-N mg/l	NO_2-N mg/l
Portneuf River	34.578	0.33	0.41	0.48	1.11	0.01
American Falls Reservoir	16.730	.06	.07	0.28	0.25	0.01
Milner Reservoir	11.086	.04	.06	0.18	0.36	0.02

TABLE XIII

PROPOSED PERMIT WASTE LOAD REDUCTIONS
BEST PRACTICABLE TREATMENT

Discharger	Percent of BOD Reduction
Golden Valley Packers	75
Idaho Potato Foods	96
Western Farmers	100*
Rogers Bros.	100*
U & I Sugar	62
Idaho Potato Starch	100*
Idaho Falls STP	-44
RT French	90
Idaho Potato Starch	100*
American Potato	95
Blackfoot STP	26
Pocatello STP	61
JR Simplot	89
Hyburn STP	100*
Bryant's Meats	100*
Ore-Ida	94
A & P	94
Alalgamated Sugar	94
Paul STP	100*

* Will combine with Local Sewer or go to Land Disposal

TABLE XIV

UPPER SNAKE RIVER
PRESENT SAMPLING STATIONS

STATION	STORET NUMBER	AGENCY	RIVER MILE	ESTABLISHED
Raft R. at Peterson Ranch	151049	IDAHO	692.00/45.6	1970
Raft R. at Yale, Ida	151050	"	692.00/8.4	1970
Snake R. bl Lk Walcott, Ida	151051	"	674.00	1970
Goose Cr. at Burley, Ida	151052	"	654.20/0.1	1970
Snake R. at Am Falls	151101	"	714.00	1969
Snake R. bl Blackfoot (Tilden Br)	151102	"	751.00	1970
Snake R. at Shelley, Ida	151103	"	785.80	1969
Snake R. at Heise, Ida	151104	"	857.80	1969
Henrys Fork W of Rexburg	151105	"	837.40/9.3	1969
Henrys Fork at Parker, Ida	151106	"	837.40/30.6	1969
Fall R. nr Chester, Ida	151107	"	837.40/40.0/2.0	1969
Henrys Fork W of Ashton	151108	"	837.40/43.8	1969
Portneuf R. at Michaud Flat	151109	"	736.00/12.3	1967
Portneuf R. at Batise Spgs	151110	"	736.00/14.0	1969
Portneuf R. at Topaz, Ida	151112	"	736.00/79.0	1969
S.F. Teton R. 1 mi N Rexburg	151118	"	837.40/11.1/7.5	1970
Island Pk Reservoir Henrys Fork	151120	"	837.40/93.1	1970
Snake R. ab Blackfoot	151121	"	768.00	1971
Snake R. bl Idaho Falls	151122	"	792.60	1970
Snake R. ab Idaho Falls	151123	"	804.70	1970
Henrys Fork at Last Chance	151124	"	837.40/81.7	1971
Snake R. at Palisades Dam	151125	"	901.60	1971
Snake R. at Alpine	151126	"	918.00	1971
Teton R. at Teton	151127	"	837.40/11.1/17.6	1971
Willow Cr. 2 mi S. of Ririe	151128	"	800.45/25.4	1970
Grays Lk Outlet 3.5 mi W Wayan	151129	"		1970
Blackfoot R. 8 mi SW Blackfoot	151130	"	751.20/2.3	1970
Portneuf R. ab Pocatello	151131	"	736.00/18.8	1970
Portneuf R. bl Pocatello	151132	"	736.00/14.7	1968

TABLE XV

UPPER SNAKE RIVER
PRESENT SAMPLING STATIONS

STATION	STORET NUMBER	AGENCY	RIVER MILE	ESTABLISHED
Snake R. nr Heise, Ida	13037500	USGS		1953
Bechler R. at Mouth	13046690	"		1969
Henrys Fork at St. Anthony, Ida	13050500	"	837.40/34.9	1971
Teton R. nr St. Anthony, Ida	13055000	"		1965
S. Fk Teton R. at Rexburg	13055340	"		1971
Henrys Fork nr Rexburg	13056500	"		1965
Grays Lk Outlet nr Herman, Ida	13057500	"		1970
Willow Cr nr Ririe, Ida	13058000	"		1969
Snake R. nr Shelley, Ida	13060000	"		1970
Blackfoot R. ab Reservoir nr Henry	13063000	"		1970
Blackfoot R. nr Blackfoot, Ida	13068500	"		1967
Danielson Cr. nr Springfield, Ida	13069540	"		1970
Portneuf R. at Topaz, Ida	13073000	"		1970
Marsh Cr. nr McCammon, Ida	13075000	"		1970
Portneuf R. at Pocatello, Ida	13075500	"		1966
Batise Spgs. nr Pocatello, Ida	13075810	"		1970
Portneuf R. nr Tyhee, Ida	13075910	"		1970
Wide Cr. nr Pocatello, Ida	13075920	"		1971
Kinney Cr. nr Fort Hall, Ida	13075970	"		1971
Spring Cr. S Ferry Butle	13075980	"		1970
Spring Cr. nr Fort Hall, Ida	13075985	"		1971
Bannock Cr. nr Pocatello, Ida	13076200	"		1969
Aberdeen Wasteway nr Aberdeen	13076300	"		1970
Reuger Spgs. nr Am Falls	13076600	"		1970
Snake R. at Necley, Ida	13077000	"		1969
Rock Cr. nr Am Falls	13077650	"		1968
Raft R. at Peterson Ranch	13078000	"		1965
Raft R. at Yale, Ida	13079900	"		1966
Goose Crab Trapper Cr. nr Oakley	13082500	"		1971
Trapper Cr. nr Oakley, Ida	13083000	"		1971
Lk Milner at Milner Dam Ida	13087900	"	640.01	1968

UPPER SNAKE RIVER
PRESENT SAMPLING STATIONS

STATION	STORET NUMBER	AGENCY	RIVER MILE	ESTABLISHED
At Lorenzo	150056	EPA	844.9	1972
East of Roberts	153299	"	819.0	1972
Above Idaho Falls Power Plant	150051	"	804.7	1962
At Grandview Dr. (Idaho Falls)	153035	"	801.2	1971
At Idaho Falls Broadway Bridge	153061	"	799.9	1971
At Idaho Falls (17 St Bridge)	153036	"	799.25	1971
Below Idaho Potato Starch	153060	"	795.0	1971
Near Shelley (Bennett Bridge)	150050	"	792.3	1962
2 miles West of Shelley	153059	"	785.5	1971
At Firth	153058	"	780.2	1971
2 miles North of Blackfoot	153057	"	764.7	1971
Near Blackfoot	153056	"	764.0	1971
At Blackfoot	153037	"	763.8	1971
5 miles above Tilden Bridge	153055	"	755.6	1971
At Tilden Bridge	150047	"	751.0	1962
6 miles below Tilden Bridge	153053	"	745.0	1971
At Fort Hall	153291	"	738.2	1972
American Falls Reservoir	153050	"	725.0	1971
American Falls Reservoir above American Falls Dam	153049	"	714.4	1971
Below American Falls Dam	153016	"	714.0	1969
Near Massacre Rocks	150061	"	699.0	1971
Below Minidoka Dam	150032	"	674.9	1962
4 miles below Minidoka Dam	153270	"	671.2	1972
5 miles East of Heyburn	153048	"	665.1	1971
At Burley-Heyburn Bridge	150031	"	654.0	1962
At Burley Highway 27	153047	"	652.3	1971
Below Custer Island at Burley	153085	"	649.5	1971
Below Ore-Ida at Burley	153046	"	647.2	1971
Above Milner Dam	153001	"	640.01	1968
Below Milner Dam	150029	"	639.7	1962

TABLE XVII

UPPER SNAKE RIVER TRIBUTARY SAMPLING STATIONS
(Rivers, Creeks, Canals, Drains, Etc.)

- EPA -

STATION	STORET NUMBER	RIVER MILE	ESTABLISHED
South Fork Teton River near Rexburg	150053	837.4/11.1/8.5	1972
North Fork Teton River near Sugar	150054	837.4/20.4/11.8	1972
Henrys Fork at St. Anthony	150055	837.4/34.9	1972
Spring Creek - West of Menan	153328	820.1	1972
Dry Bed Canal - West of Lewisville	153330	815.7	1972
Southparks - Lewisville Canal	153331	815.0/1.2	1972
Market Lake Canal	153329	813.2	1972
North Fork Willow Creek	153274	801.4/0.1	1972
South Fork Willow Creek	153275	800.7/0.1	1972
Crow Creek	153276	799.0/0.2	1972
Waste Ditch	153277	786.1	1972
Blackfoot River near Mouth	150048	751.2/0.1	1972
Diggie Creek	153278	747.8/0.75	1972
Jeff Cabin Creek	153279	744.4/1.60	1972
McTucker Springs	153281	739.7	1972
Spring - 3 1/2 miles SE Spfd	153294	738.6/0.9	1972
Spring 12 c	153283	738.4/0.3	1972
Danielson Creek near Spfd	153284	738.5/2.4	1972
Danielson Creek	153282	738.5/0.1	1972
Clear Creek	153290	738.4/5.05	1972
Gibson Drain	153289	738.4/4.25/1.3	1972
Drain near Sterling	153285	738.3/0.1	1972
Ross Fork Creek	153288	738.4/0.1/9.8	1972
Spring Creek near Blackfoot	153280	735.5/5.4	1972
Waste Stream near Balckfoot	153293	735.5/11/0.2	1972
Spring Creek at Bronco Road	153292	735.5/11.25	1972
Portneuf River at Siphon Road Bridge	150038	736.0/11.7	1962
Portneuf River at Rowlands Dairy	153296	736.0/13.0	1972
Spring at Rowlands Dairy	153287	736.0/13.3	1972
Portneuf River above Pocatello STP	153038	736.0/13.5	1971
Portneuf River West of Pocatello	150039	736.0/14.6	No Data
Portneuf River above Zwigerts	153295	736.0/17.0	1972
Portneuf River at Portneuf	150042	736.0/22.0	1972
Bannock Creek	153286	727.0/2.5	1972
Aberdeen Drain at Aberdeen	153054	726.1/3.6	1971
Rock Creek	153272	704.1/0.9	1972
Fall Creek	153271	699.75/0.06	1972
Raft River	150034	692.0/1.4	1972
D3	153231	668.05/0.6	1972
D4	153232	664.8/0.95	1972
D5	153233	663.7/0.3	1972
D5C	153234	662.55	1972
Marsh Creek	153256	660.42	1972
Spring Creek Drain	153255	659.3	1972
Rasmussen Drain	153254	658.82/1.3	1972
Goose (Snipe) Creek	153298	653.99	1972
D16	153235	653.7	1972
D7	153236	653.4/0.3	1972
B - Canal	153269	652.7	1972
D12A	153237	652.29/0.5	1972
D13	153238	652.0/0.5	1972
Morgan Gulch Drain	153245	649.6/0.9	1972
D17	153239	648.3/3.5	1972
Main Drain	150057	646.9/1.8	1972
J Wasteway	153244	645.3/1.4	1972

TABLE XVIII

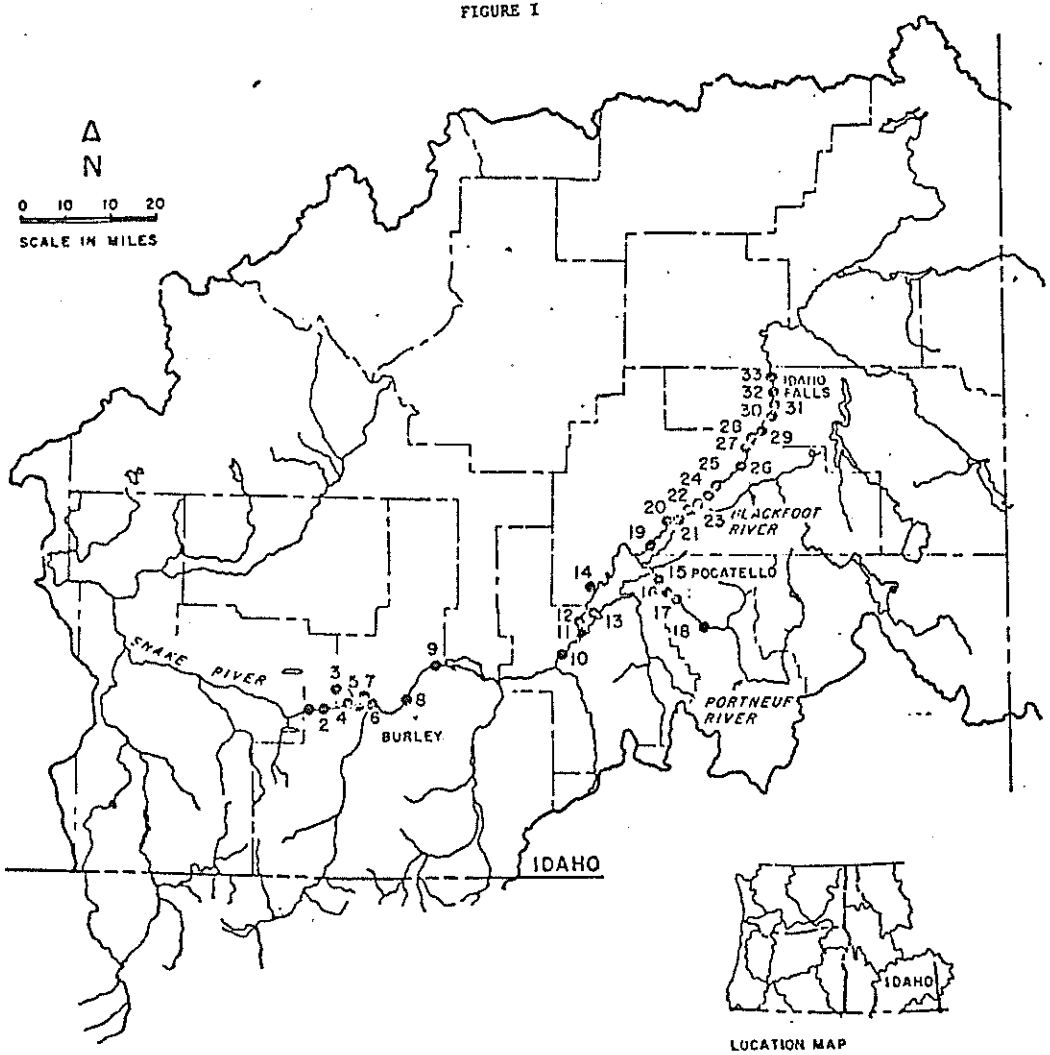
UPPER SNAKE RIVER POINT SOURCE SAMPLING STATIONS

- EPA -

STATION	STORET NUMBER	RIVER MILE	ESTABLISHED
Municipal			
Idaho Falls Storm Sewer	153166	799.4	1971
Idaho Falls STP	153077	797.2	1971
Shelley Storm Sewer	153171	787.6	1971
Shelley STP	153200	787.0	1971
Blackfoot STP	153073	762.0	1971
Pocatello STP	153062	736.0/13.2	1971
American Falls STP	153198	713.5	1972
Rupert STP	153083	665.1	1971
Heyburn STP	153084	653.4	1971
Burley STP	153070	652.9	1971
Burley Lagoon (North)	153344	652.29	1972
Paul STP	153201	646.9/7.2	1971
Industrial			
Remington Brothers Produce	153202	837.4/35.0	1971
Ball Brothers Fresh Pak	153158	815.7/ —	1971
Clement Brothers Fresh Pak	153159	815.7/10.6	1971
Golden Valley Packers	153066	812.6	1971
Idaho Potato Foods	153082	804.0	1971
Western Farmers	153081	799.6	1971
U&I Sugar	153080	799.4	1971
Rogers Bros 001	153079	799.3	1971
Rogers Bros 002	153167	799.2/0.1	1971
Idaho Potato Starch	153078	797.9	1971
R.T. French	153076	787.6/1.0	1971
Idaho Potato Starch	153075	764.1	1971
American Potato	153074	763.4	1971
Papoose Springs Trout Farm	153174	736.0/11.6	1971
J.R. Simplot 001 - Poc.	153064	736.0/13.6	1971
J.R. Simplot 002 - Poc.	153173	736.0/13.7	1971
FMC	153063	736.0/13.7	1971
Union Pacific Railroad	153197	736.0/16.8	1972
Reuger Springs Fish Hatchery	153297	712.3	1972
J.R. Simplot 001 - Bur.	153071	653.8	1971
J.R. Simplot 002 - Bur.	153172	653.7	1971
Bryant's Meat Packing	153069	649.9	1971
Ore-Ida 004	153169	649.1	1971
Ore-Ida 003	153170	648.9	1971
Ore-Ida 002	153168	648.7	1971
Ore-Ida 001	153068	648.7	1971
A&P	153067	648.4	1971
Amalgamated Sugar	153065	646.9/8.7	1971

APPENDIX B

FIGURE I

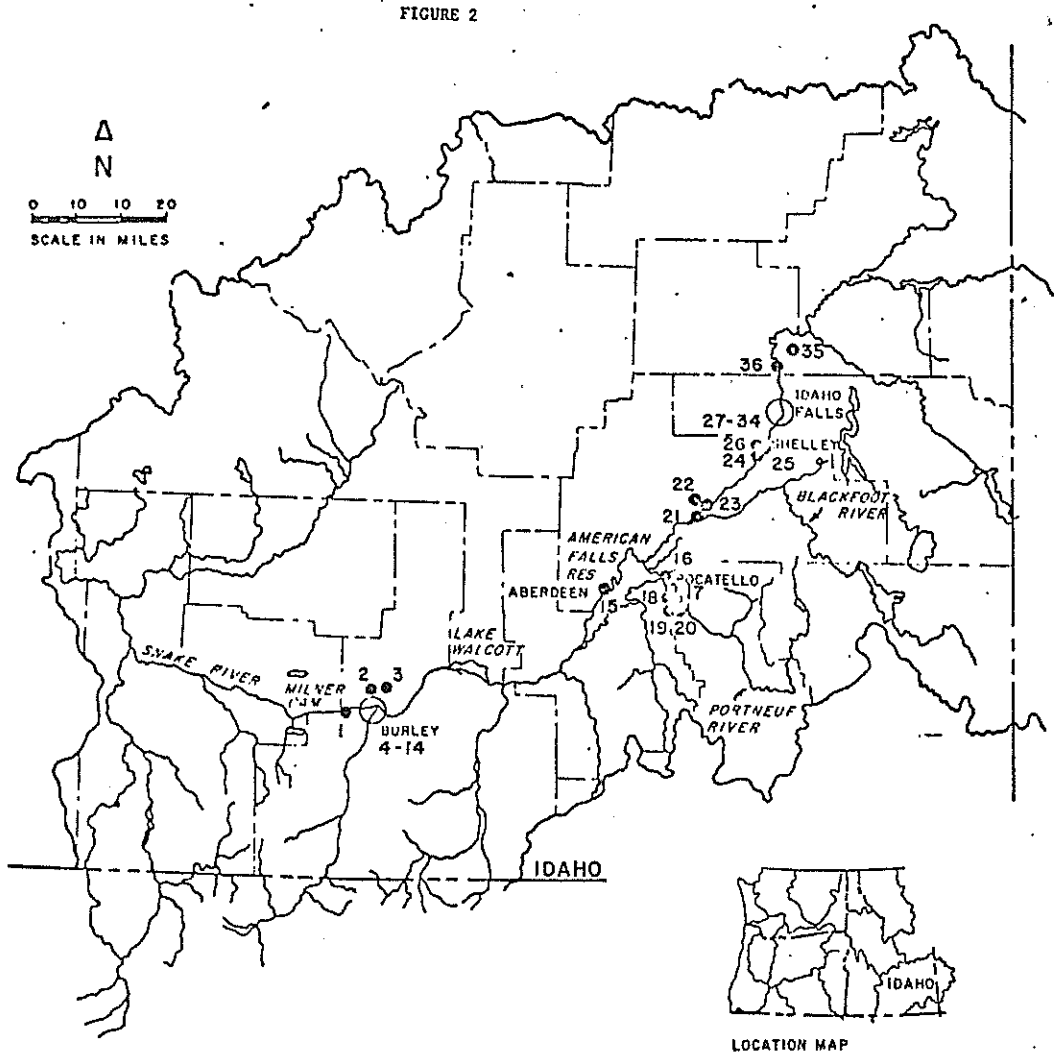


UPPER SNAKE BASIN - IDAHO

UPPER SNAKE RIVER STUDY
OCTOBER 1971
STREAM MONITORING STATIONS

1	150029	SNAKE R BL MILNER DAM RM 639.70
2	153001	LK MILNER AT MILNER DAM RM 640.01
3	150057	MAIN DRAIN AT 950 WEST ROAD RM 646.9 TM I-80
4	153046	LK MILNER BL ORE - IDA AT BURLEY RM 647.2
5	153085	LK MILNER BL CUSTER ISL AT BURLEY RM 650.5
6	150031	SNAKE R AT BURLEY - HEYBURN RM 654.00
7	153047	LK MILNER AT BURLEY HWY 27 RM 652.30
8	153048	LK MILNER 5 MI. E OF HEYBURN (I - 80) RM 664.4
9	150032	SNAKE R BL MINIDOKA DAM RM 674.90
10	150061	SNAKE R NR MASSACRE ROCKS RM 699.00
11	153016	SNAKE R BL AMERICAN FALLS DAM RM 714.00
12	153049	AM FALLS RESERVOIR AB AM FALLS DAM RM 714.40
13	153050	AM FALLS RESERVOIR RM 725 00
14	153054	ABERDEEN DRAIN AT ABERDEEN RM 726.1 TM 3.6
15	150038	PORTNEUF R AT SIPHON RD BR RM 11.70
16	153038	PORTNEUF R AB POCATELLO STP RM 13.50
17	150039	PORTNEUF R WEST OF POCATELLO HWY 30 RM 14.70
18	150042	PORTNEUF R AT PORTNEUF RM 22.00
19	153053	SNAKE R 6 MI BL TILDEN BR RM 745.00
20	150047	SNAKE R AT TILDEN BR RM 751.00
21	150048	BLACKFOOT R AT MOUTH RM .10
22	153055	SNAKE R. 5 MI AB TILDEN BR RM 755.60
23	153037	SNAKE R AT BLACKFOOT RM 763.80
24	153056	SNAKE R NR BLACKFOOT RM 764.00
25	153057	SNAKE R 2 MI N OF BLACKFOOT RM 764.70
26	153058	SNAKE R NR FIRTH RM 780.20
27	153059	SNAKE R 2 MI W OF SHELLEY RM 785.50
28	150050	SNAKE R PR SHELLEY (BENNETT BR) RM 792.30
29	153060	SNAKE R BL IDAHO POTATO STARCH RM 795.00
30	153036	SNAKE R AT IDAHO FALLS (17TH ST BR) RM 799.40
31	153061	SNAKE R AT IDAHO FALLS BROADWAY BR RM 799.90
32	153035	SNAKE R AT GRANDVIEW DR (IDAHO FALLS) RM 801.20
33	150051	SNAKE R AB IDAHO FALLS POWER PLANT RM 804.70

FIGURE 2



UPPER SNAKE BASIN - IDAHO

UPPER SNAKE RIVER STUDY
OCTOBER 1971
WASTE SOURCE MONITORING

1	150057	MAIN DRAIN RM 646.9 TM 1.8
2	153201	PAUL STP RM 646.9 TM 7.2
3	153065	AMALGAMATED SUGAR RM 646.9 TM 8.7
4	153067	A&P RM 648.4
5	153068	ORE-IDA (001) RM 648.7
6	153168	ORE-IDA (002) RM 648.7
7	153170	ORE-IDA (003) RM 648.9
8	153169	ORE-IDA (004) RM 649.1
9	153069	BRYANT'S MEAT PACKING RM 649.9
10	153070	BURLEY STP RM 652.9
11	153084	HEYBURN STP RM 653.4
12	153172	J R SIMPLOT (002) RM 653.7
13	153071	J R SIMPLOT (001) RM 653.8
14	153083	RUPERT STP RM 665.1
15	153054	ABERDEEN DRAIN RM 726.1 TM 3.6
16	153174	PAPOOSE SPRINGS TROUT FARM RM 736.0 TM 11.6
17	153062	POCATELLO STP RM 736.0 TM 13.2
18	153064	J R SIMPLOT (001) RM 736.0 TM 13.6
19	153173	J R SIMPLOT (002) RM 736.0 TM 13.7
20	153063	FML RM 736.0 TM 13.7
21	153073	BLACKFOOT STP RM 762.0
22	153075	IDAHO POTATO STARCH RM 764.1
23	153074	AMERICAN POTATO CO. RM 763.4
24	153200	SHELLEY STP RM 787.0
25	153171	R T FRENCH OUTFALL RM 787.6
26	153076	R T FRENCH CO. RM 787.6
27	153077	IDAHO FALLS STP RM 797.2
28	153078	IDAHO POTATO STARCH RM 797.9
29	153166	U & I SUGAR CO. OUTFALL RM 799.2
30	153080	U & I SUGAR CO. PLANT RM 799.2
31	153167	ROGERS BROS. (002) RM 799.2 TM 0.1
32	153079	ROGERS BROS. (001) RM 799.3
33	153081	WESTERN FARMERS RM 799.6
34	153082	IDAHO POTATO FOODS RM 804.0
35	153159	LEWISVILLE PRODUCE RM 815.7 TM 10.6
36	153066	GOLDEN VALLEY PACKERS RM 812.6

NOTE: The north slope tributaries and the upper reaches of south slope streams have been omitted for clarity

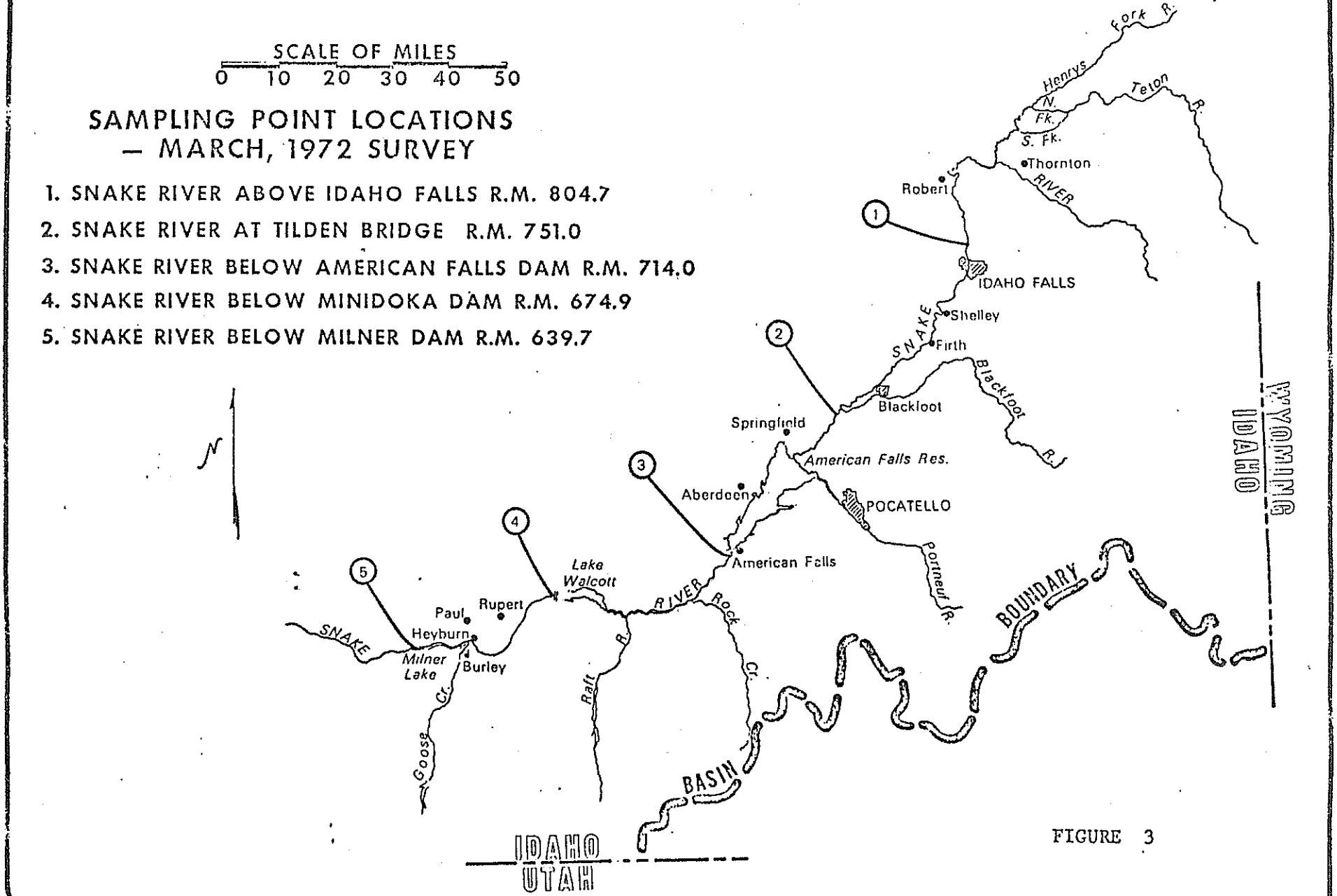


FIGURE 3

NOTE: The north slope tributaries and the upper reaches of south slope streams have been omitted for clarity

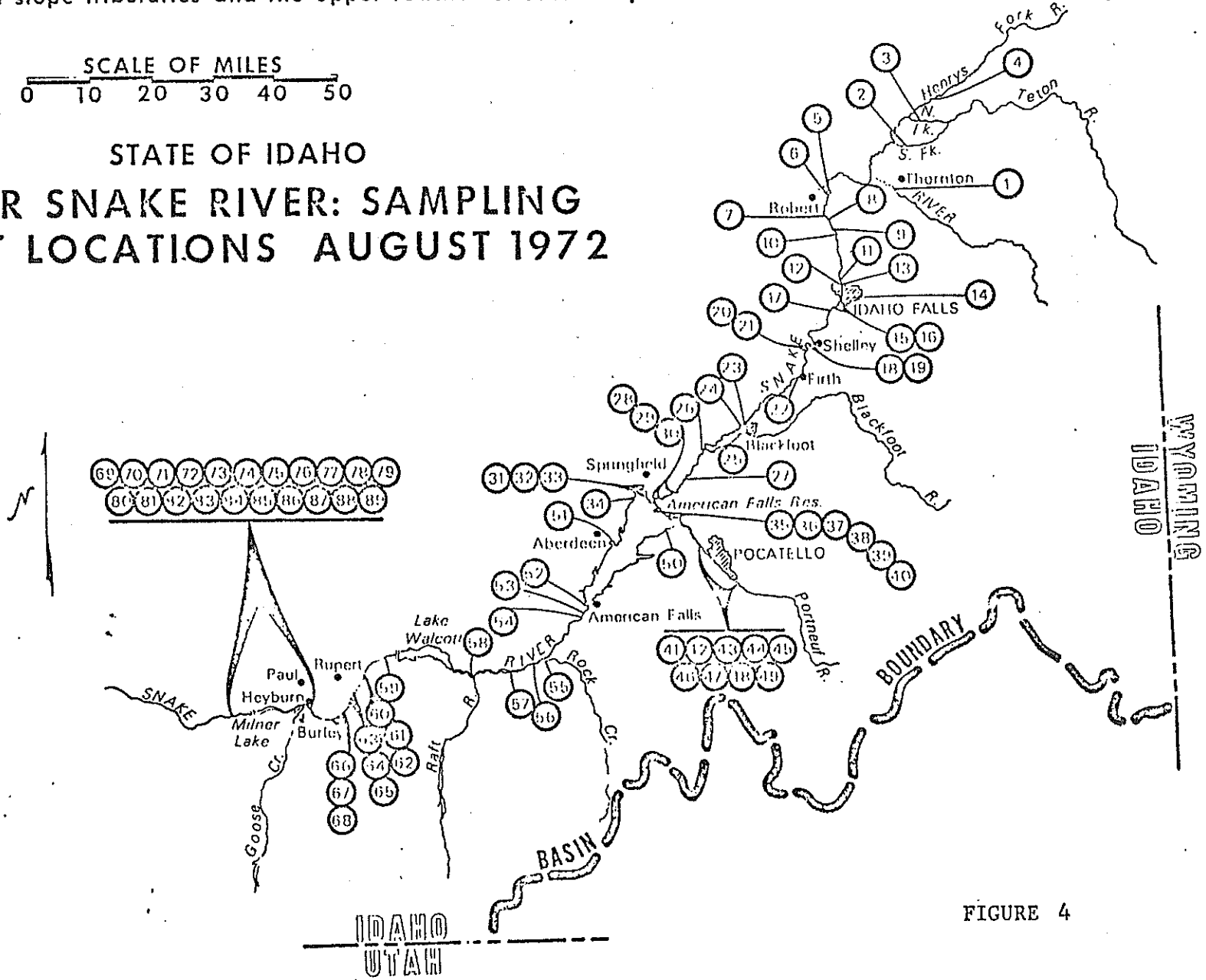


FIGURE 4

FIGURE 5

GRAPH OF PHUS-T P-WET LB/D VERSUS MILES ON THE SNAKE R FM MILNER TO LORENZO

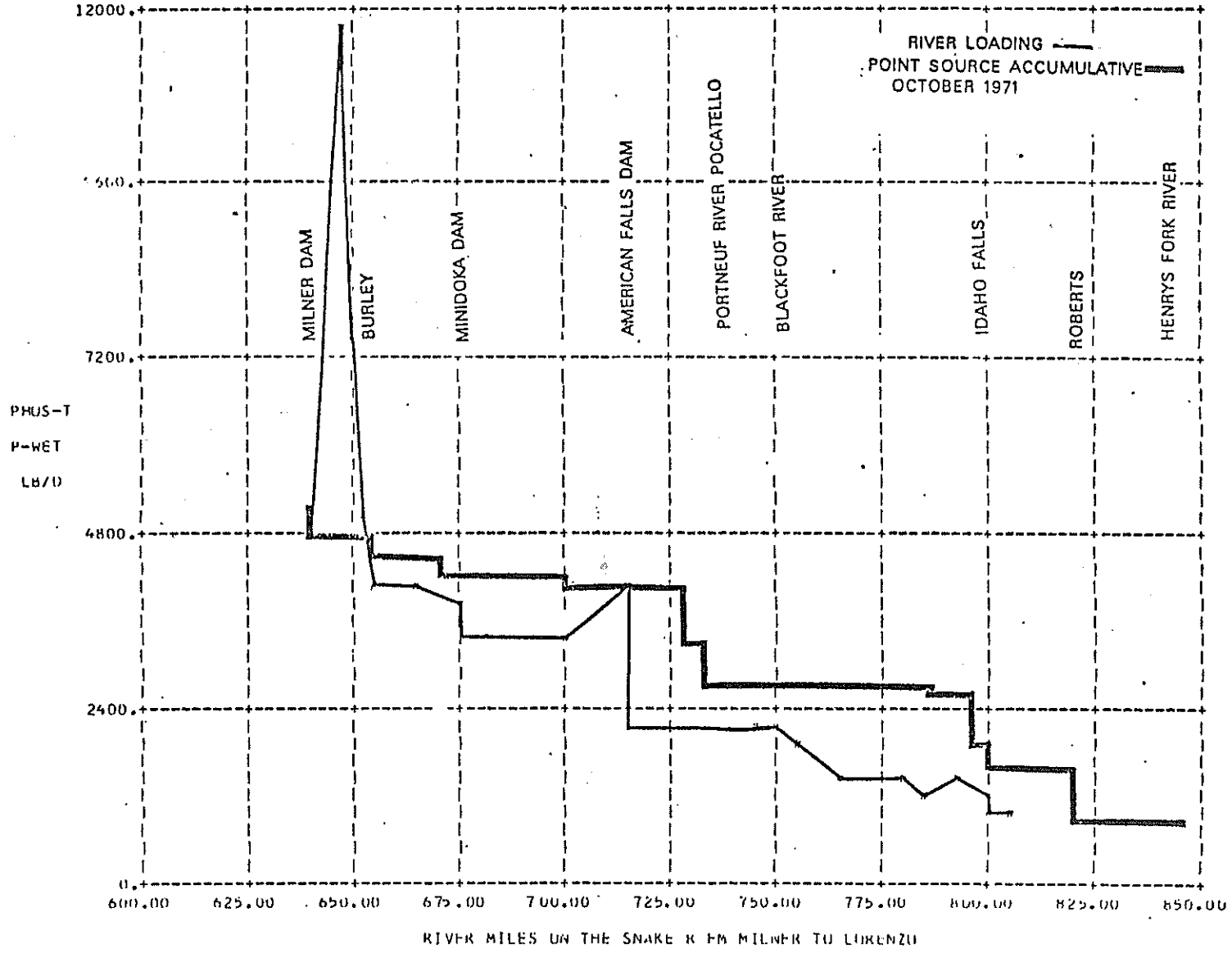


FIGURE 6

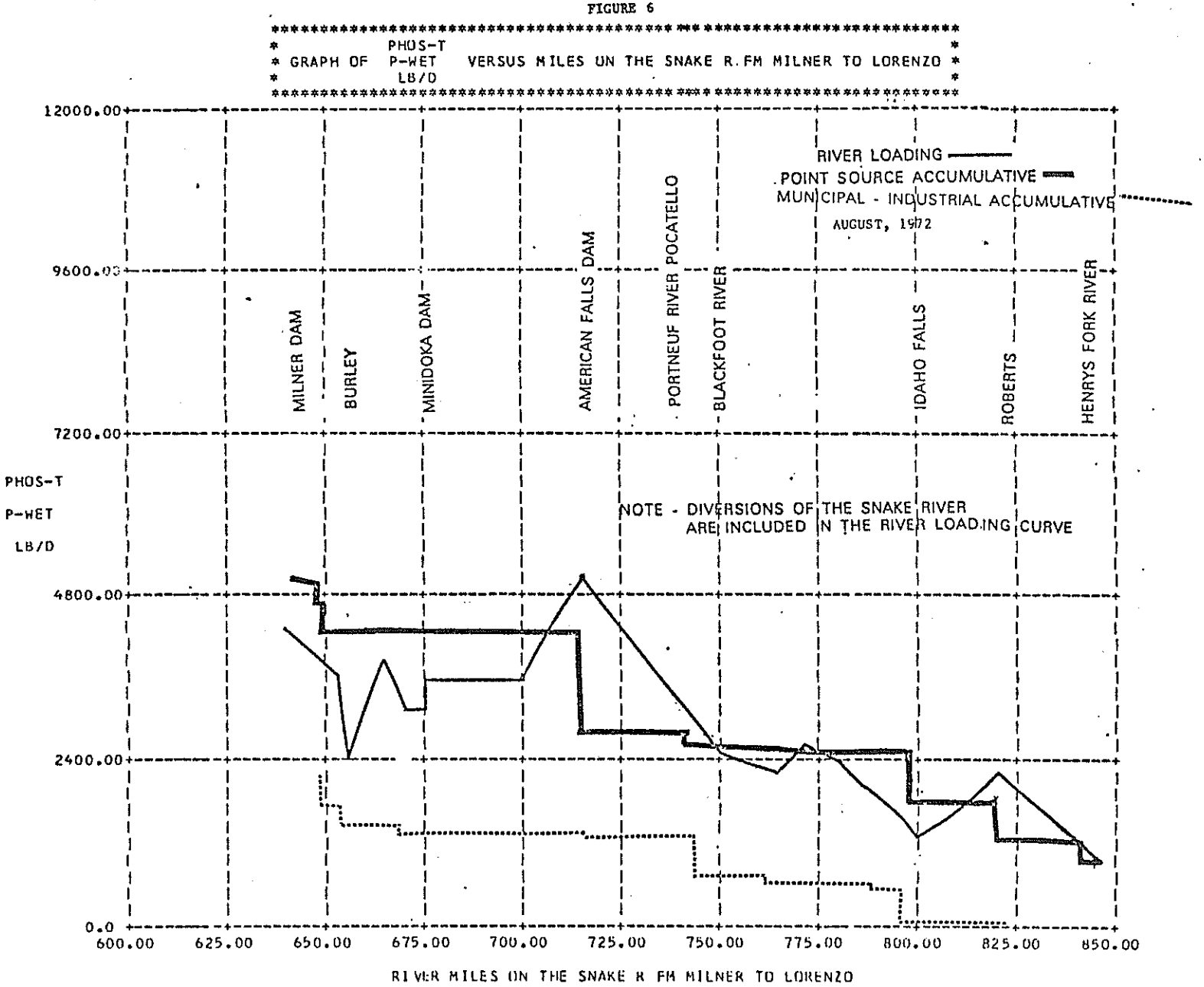

GRAPH OF PHOS-T P-WET LB/D VERSUS MILES ON THE SNAKE R. FM MILNER TO LORENZO
12000.00
9600.00
7200.00
4800.00
2400.00
0.0
PHOS-T
P-WET
LB/D
RIVER LOADING
POINT SOURCE ACCUMULATIVE
MUNICIPAL - INDUSTRIAL ACCUMULATIVE
AUGUST, 1972
NOTE - DIVERSIONS OF THE SNAKE RIVER ARE INCLUDED IN THE RIVER LOADING CURVE
MILNER DAM
BURLEY
MINIDOKA DAM
AMERICAN FALLS DAM
PORTNEUF RIVER POCATELLO
BLACKFOOT RIVER
IDAHO FALLS
ROBERTS
HENRYS FORK RIVER
600.00
625.00
650.00
675.00
700.00
725.00
750.00
775.00
800.00
825.00
850.00
RIVER MILES ON THE SNAKE R FM MILNER TO LORENZO

FIGURE 7

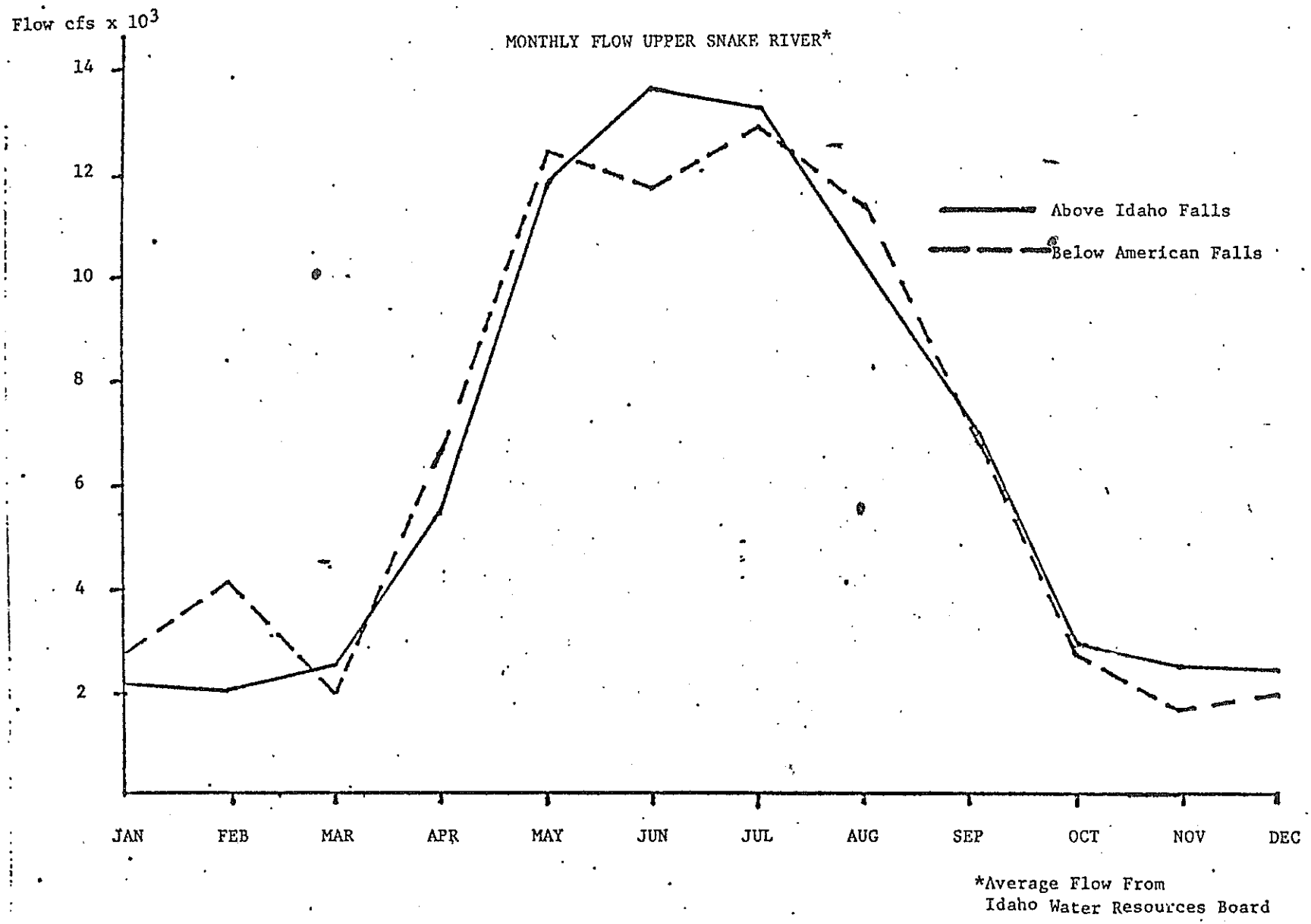

MONTHLY FLOW UPPER SNAKE RIVER*
Flow cfs x 10^3
14
12
10
8
6
4
2
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
Above Idaho Falls
Below American Falls
*Average Flow From
Idaho Water Resources Board

FIGURE 8

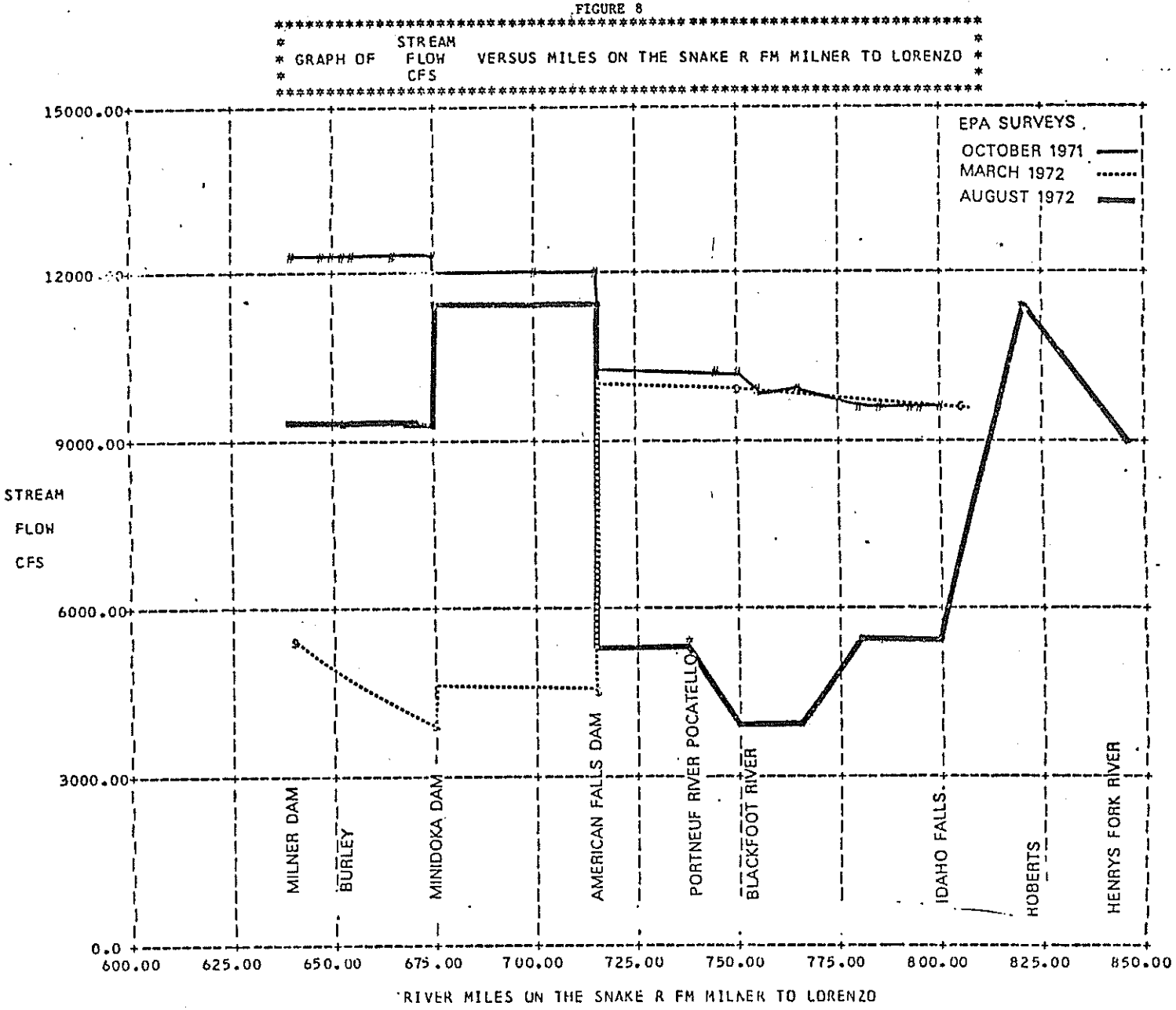

GRAPH OF STREAM FLOW CFS VERSUS MILES ON THE SNAKE R FM MILNER TO LORENZO
EPA SURVEYS
OCTOBER 1971
MARCH 1972
AUGUST 1972
STREAM FLOW CFS
15000.00
12000.00
9000.00
6000.00
3000.00
0.0
600.00
625.00
650.00
675.00
700.00
725.00
750.00
775.00
800.00
825.00
850.00
MILNER DAM
BURLEY
MINIDOKA DAM
AMERICAN FALLS DAM
PORTNEUF RIVER POCATELLO
BLACKFOOT RIVER
IDAHO FALLS
HOBERTS
HENRYS FORK RIVER
RIVER MILES ON THE SNAKE R FM MILNER TO LORENZO

FIGURE 9

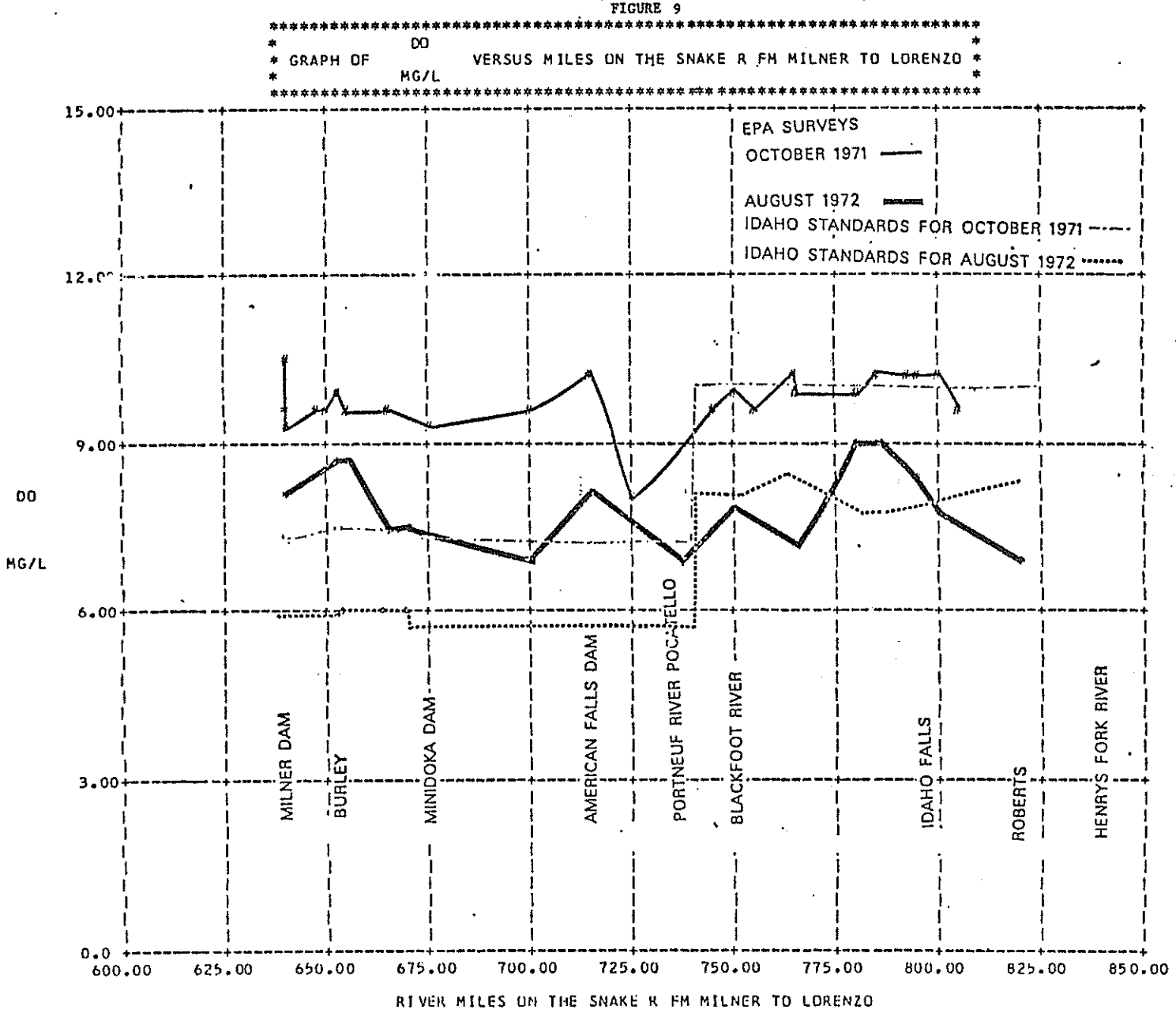

GRAPH OF DO MG/L VERSUS MILES ON THE SNAKE R FM MILNER TO LORENZO
EPA SURVEYS
OCTOBER 1971
AUGUST 1972
IDAHO STANDARDS FOR OCTOBER 1971
IDAHO STANDARDS FOR AUGUST 1972
15.00
12.00
9.00
6.00
3.00
0.0
DO
MG/L
MILNER DAM
BURLEY
MINIDOKA DAM
AMERICAN FALLS DAM
PORTNEUF RIVER POCATELLO
BLACKFOOT RIVER
IDAHO FALLS
ROBERTS
HENRYS FORK RIVER
600.00
625.00
650.00
675.00
700.00
725.00
750.00
775.00
800.00
825.00
850.00
RIVER MILES ON THE SNAKE R FM MILNER TO LORENZO

FIGURE 10

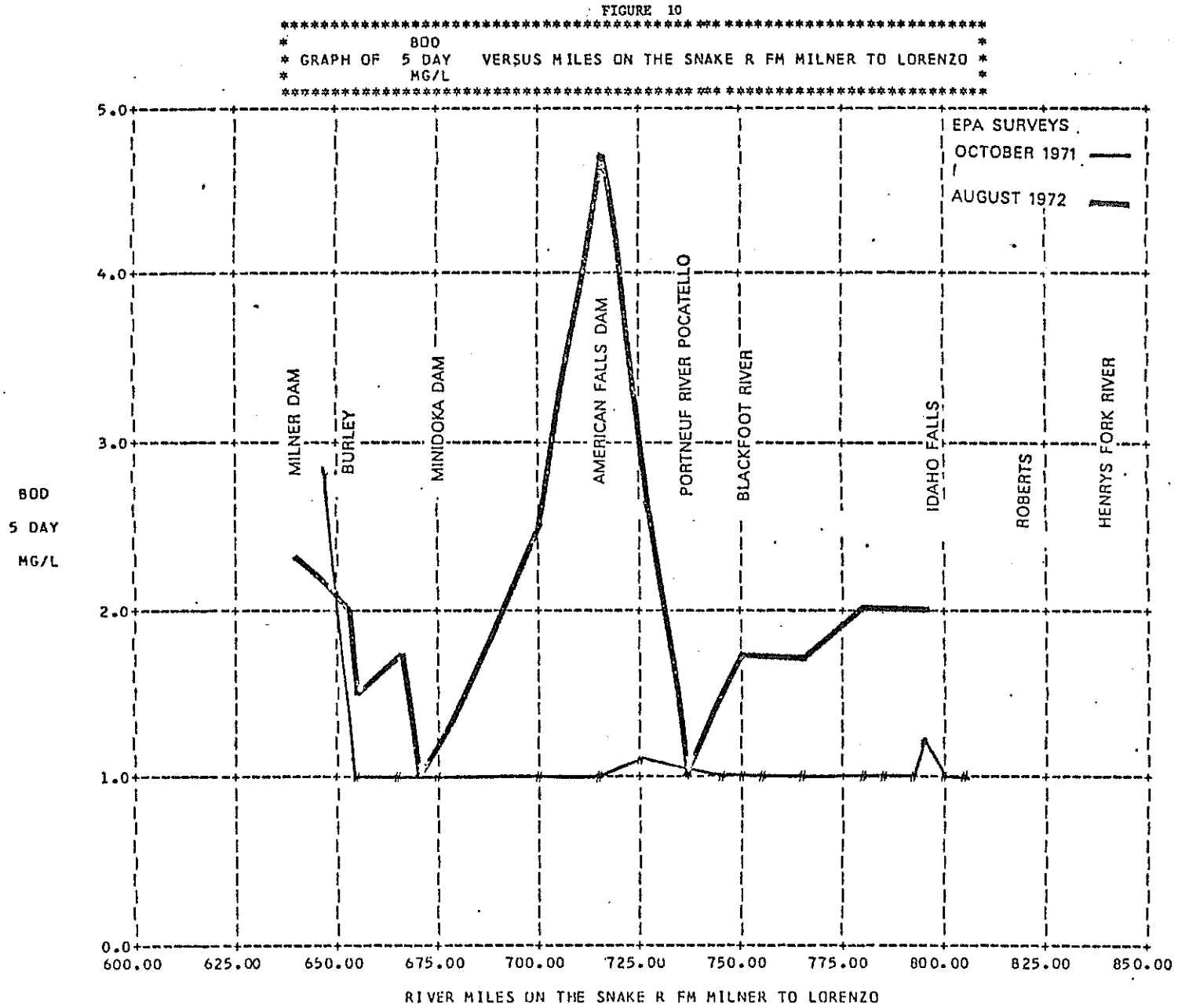
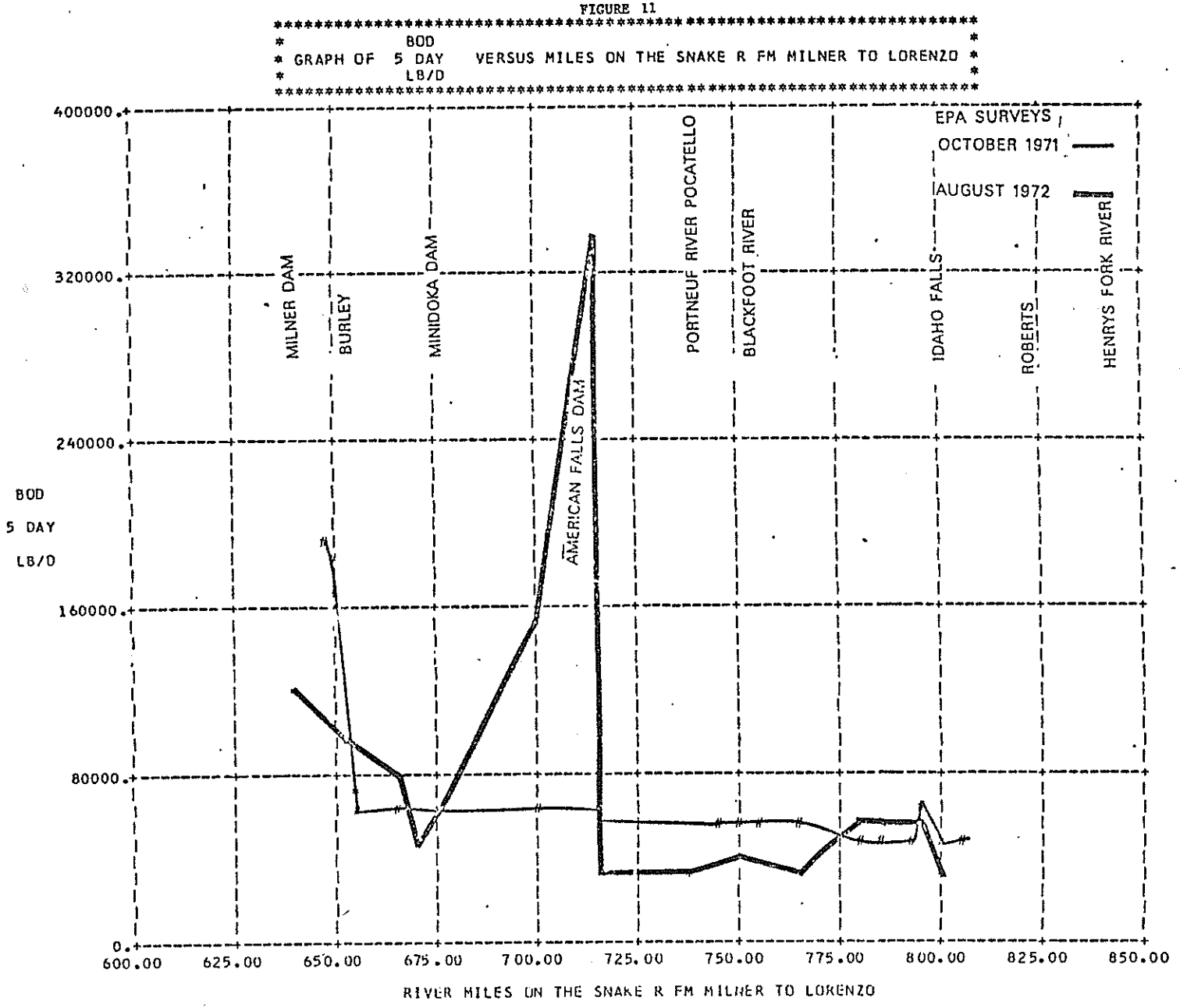

BOD
5 DAY
MG/L
EPA SURVEYS
OCTOBER 1971
AUGUST 1972
MILNER DAM
BURLEY
MINIDOKA DAM
AMERICAN FALLS DAM
PORTNEUF RIVER POCATELLO
BLACKFOOT RIVER
IDAHO FALLS
ROBERTS
HENRYS FORK RIVER
5.0
4.0
3.0
2.0
1.0
0.0
600.00
625.00
650.00
675.00
700.00
725.00
750.00
775.00
800.00
825.00
850.00
RIVER MILES ON THE SNAKE R FM MILNER TO LORENZO

FIGURE 11


GRAPH OF BOD 5 DAY LB/D VERSUS MILES ON THE SNAKE R FM MILNER TO LORENZO
EPA SURVEYS
OCTOBER 1971
AUGUST 1972
MILNER DAM
BURLEY
MINIDOKA DAM
AMERICAN FALLS DAM
PORTNEUF RIVER POCATELLO
BLACKFOOT RIVER
IDAHO FALLS
ROBERTS
HENRYS FORK RIVER
BOD
5 DAY
LB/D
400000
320000
240000
160000
80000
0
600.00
625.00
650.00
675.00
700.00
725.00
750.00
775.00
800.00
825.00
850.00
RIVER MILES ON THE SNAKE R FM MILNER TO LORENZO

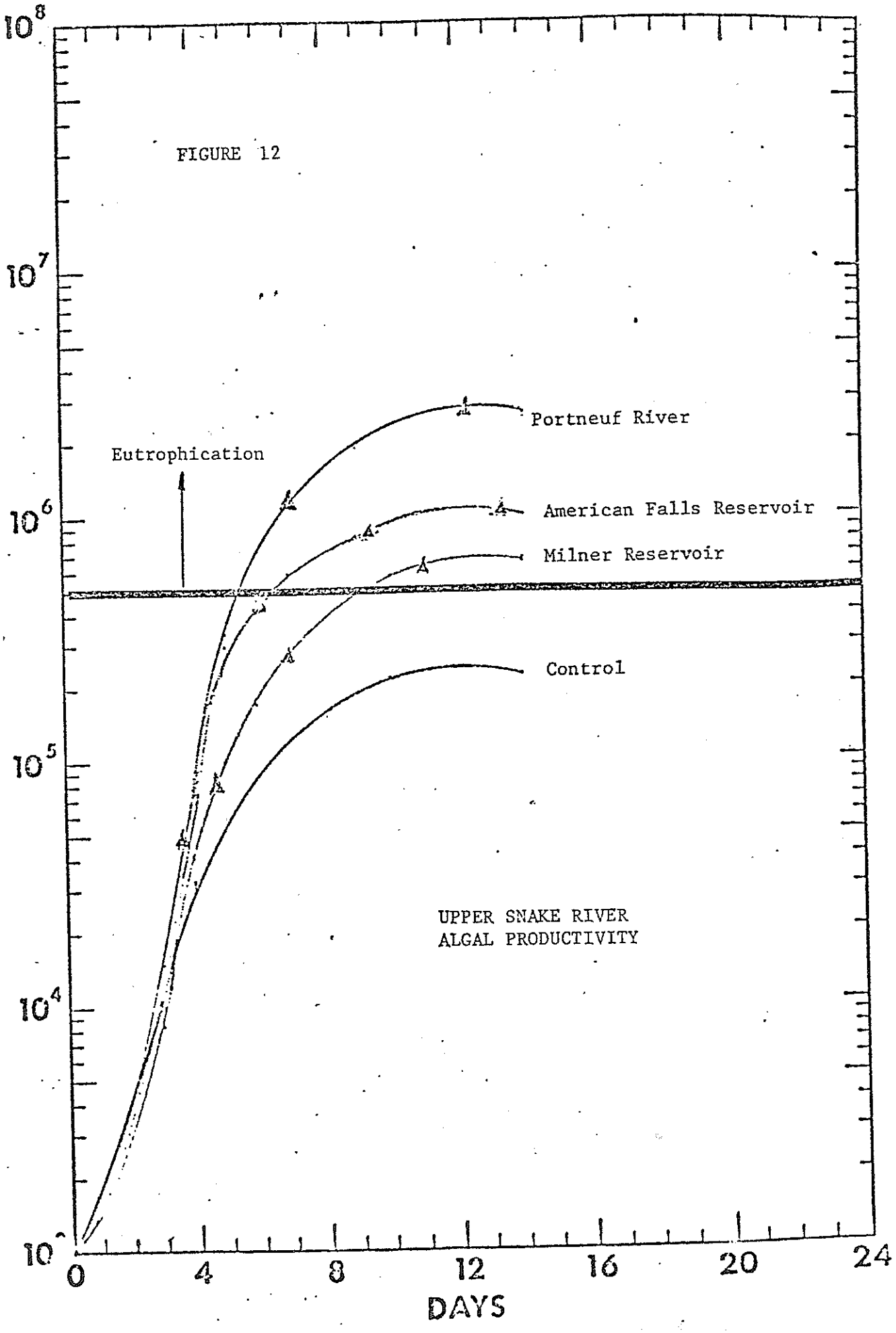


FIGURE 12
10^8
10^7
10^6
10^5
10^4
10^3
Eutrophication
Portneuf River
American Falls Reservoir
Milner Reservoir
Control
UPPER SNAKE RIVER
ALGAL PRODUCTIVITY
0
4
8
12
16
20
24
DAYS

FIGURE 13

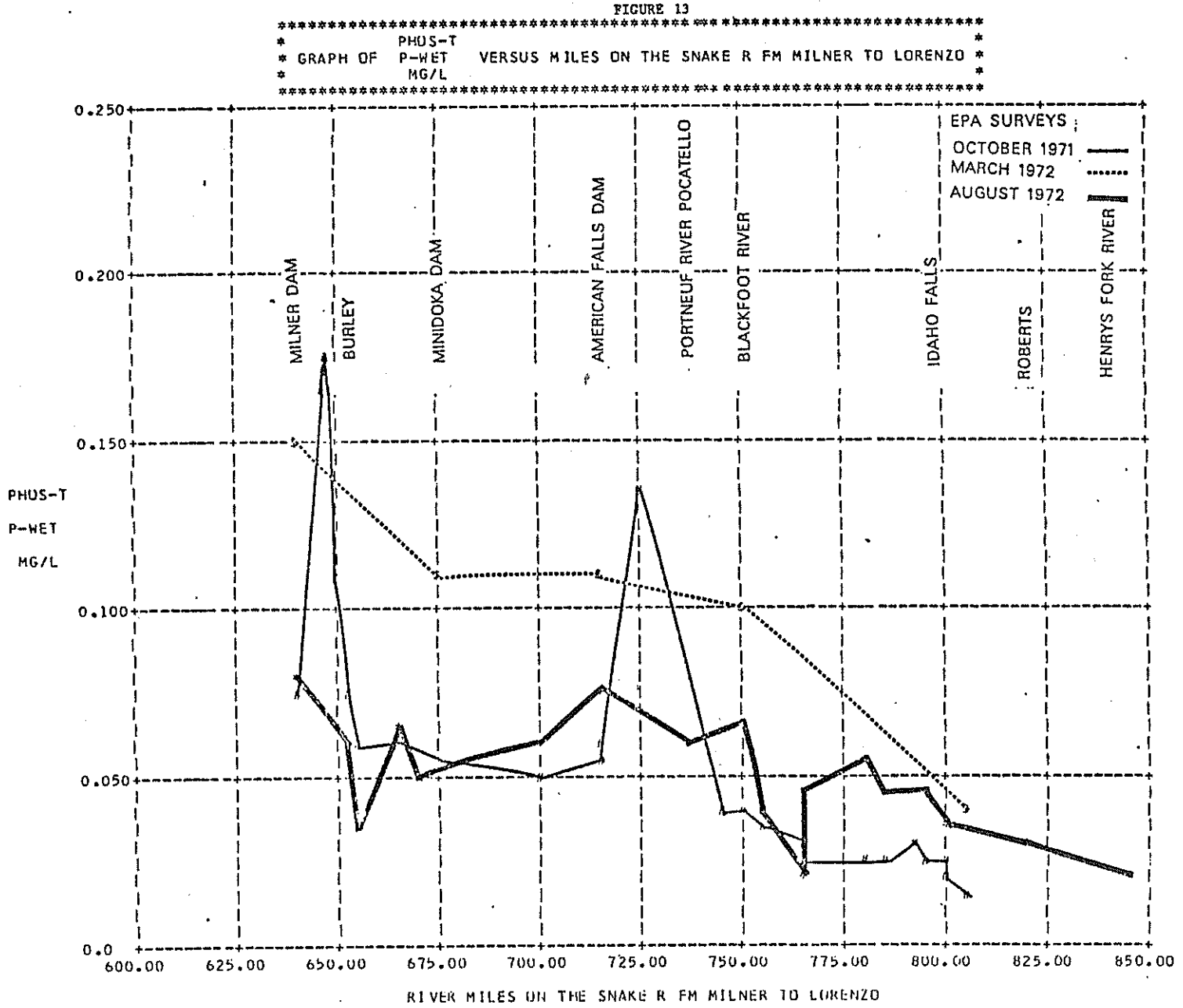

GRAPH OF PHOS-T P-WET MG/L VERSUS MILES ON THE SNAKE R FM MILNER TO LORENZO
EPA SURVEYS
OCTOBER 1971
MARCH 1972
AUGUST 1972
MILNER DAM
BURLEY
MINIDOKA DAM
AMERICAN FALLS DAM
PORTNEUF RIVER POCATELLO
BLACKFOOT RIVER
IDAHO FALLS
ROBERTS
HENRYS FORK RIVER
PHOS-T
P-WET
MG/L
0.250
0.200
0.150
0.100
0.050
0.0
600.00
625.00
650.00
675.00
700.00
725.00
750.00
775.00
800.00
825.00
850.00
RIVER MILES ON THE SNAKE R FM MILNER TO LORENZO

FIGURE 14

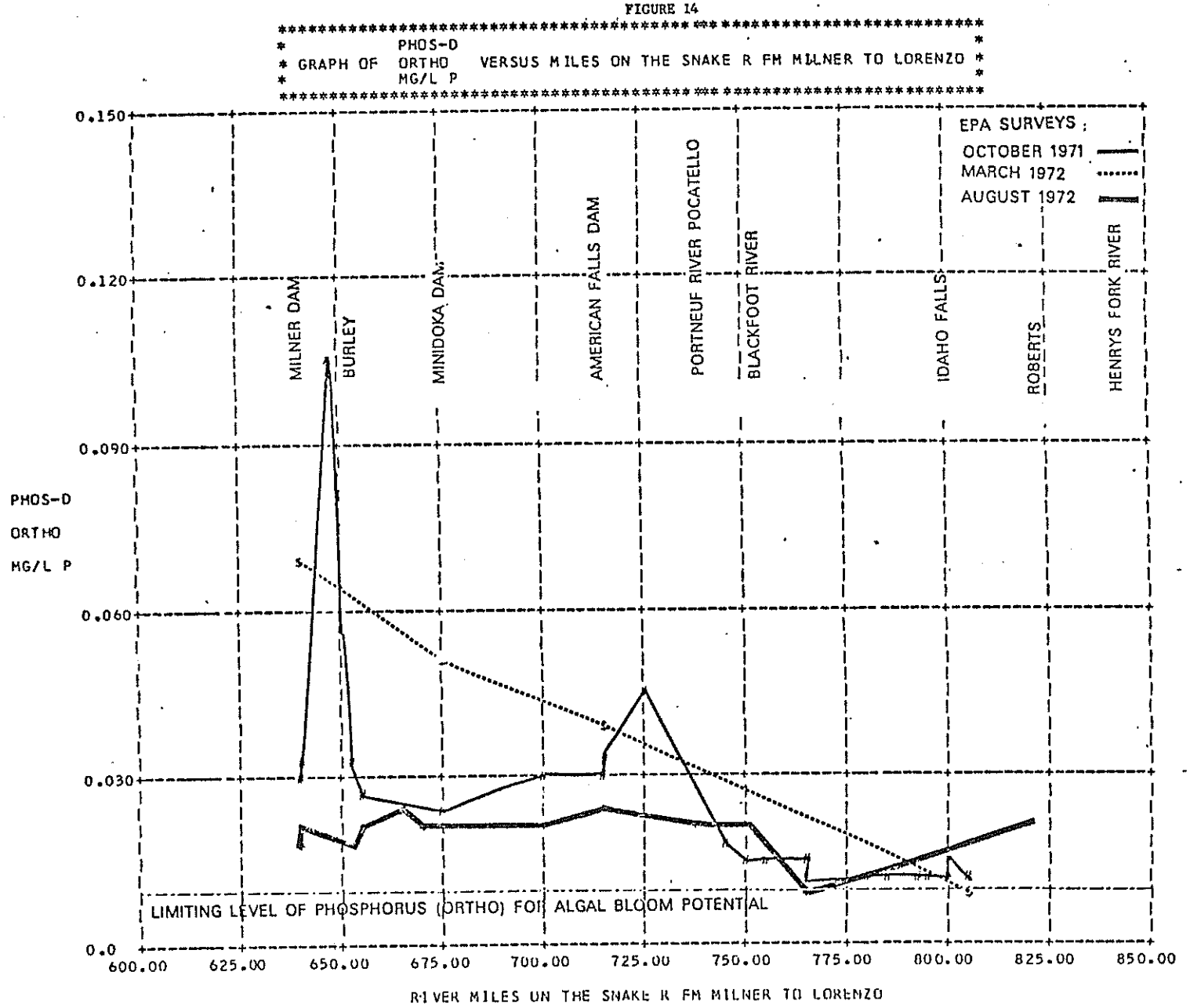

GRAPH OF PHOS-D ORTHO MG/L P VERSUS MILES ON THE SNAKE R FM MILNER TO LORENZO
EPA SURVEYS :
OCTOBER 1971
MARCH 1972
AUGUST 1972
MILNER DAM
BURLEY
MINIDOKA DAM
AMERICAN FALLS DAM
PORTNEUF RIVER POCATELLO
BLACKFOOT RIVER
IDAHO FALLS
ROBERTS
HENRYS FORK RIVER
PHOS-D ORTHO MG/L P
0.150
0.120
0.090
0.060
0.030
0.0
LIMITING LEVEL OF PHOSPHORUS (ORTHO) FOR ALGAL BLOOM POTENTIAL
600.00
625.00
650.00
675.00
700.00
725.00
750.00
775.00
800.00
825.00
850.00
RIVER MILES ON THE SNAKE R FM MILNER TO LORENZO

FIGURE 15

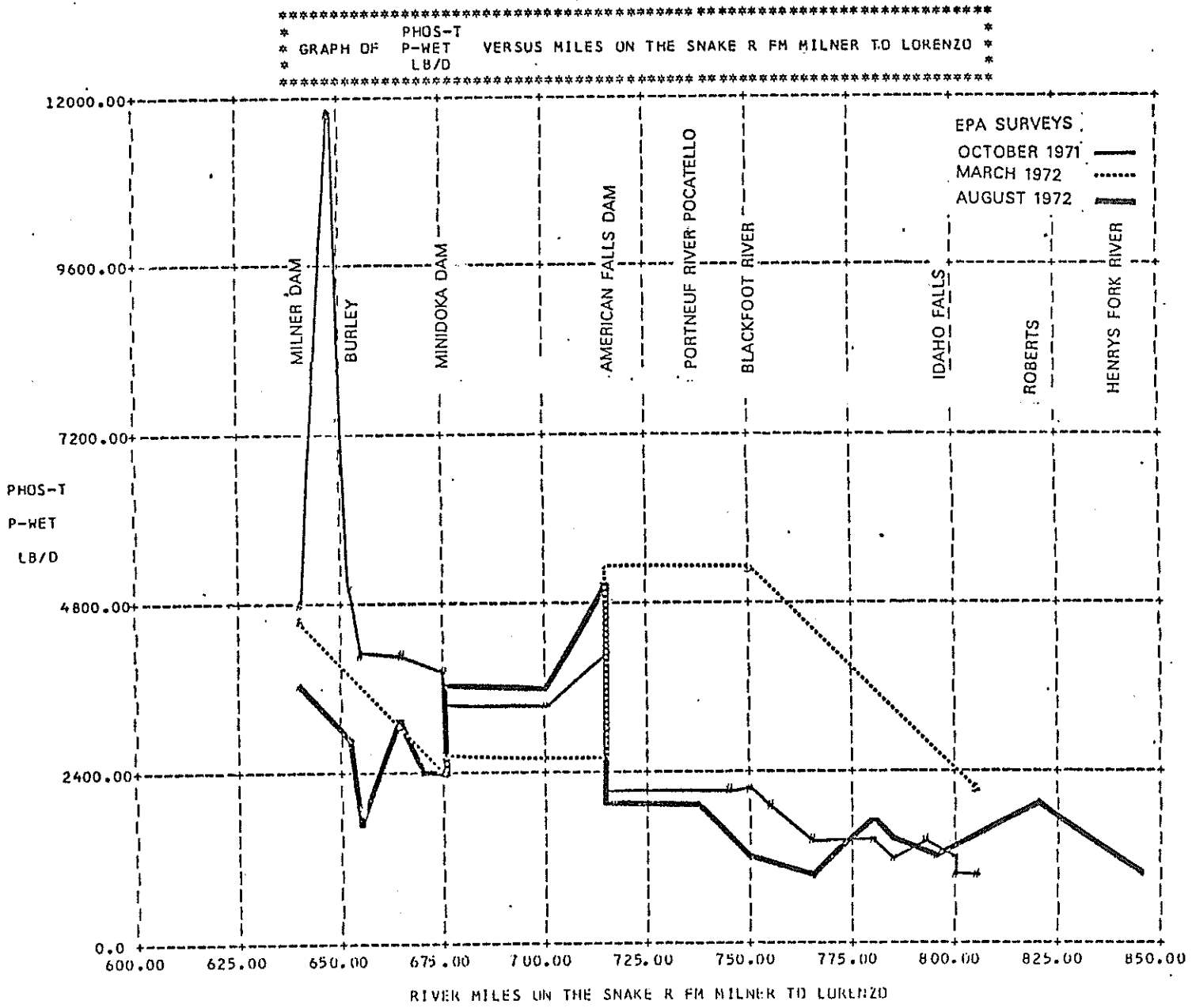

GRAPH OF PHOS-T P-WET LB/D VERSUS MILES ON THE SNAKE R FM MILNER TO LORENZO
12000.00
9600.00
7200.00
4800.00
2400.00
0.0
PHOS-T
P-WET
LB/D
EPA SURVEYS
OCTOBER 1971
MARCH 1972
AUGUST 1972
MILNER DAM
BURLEY
MINIDOKA DAM
AMERICAN FALLS DAM
PORTNEUF RIVER POCATELLO
BLACKFOOT RIVER
IDAHO FALLS
ROBERTS
HENRYS FORK RIVER
600.00
625.00
650.00
675.00
700.00
725.00
750.00
775.00
800.00
825.00
850.00
RIVER MILES ON THE SNAKE R FM MILNER TO LORENZO

FIGURE 16

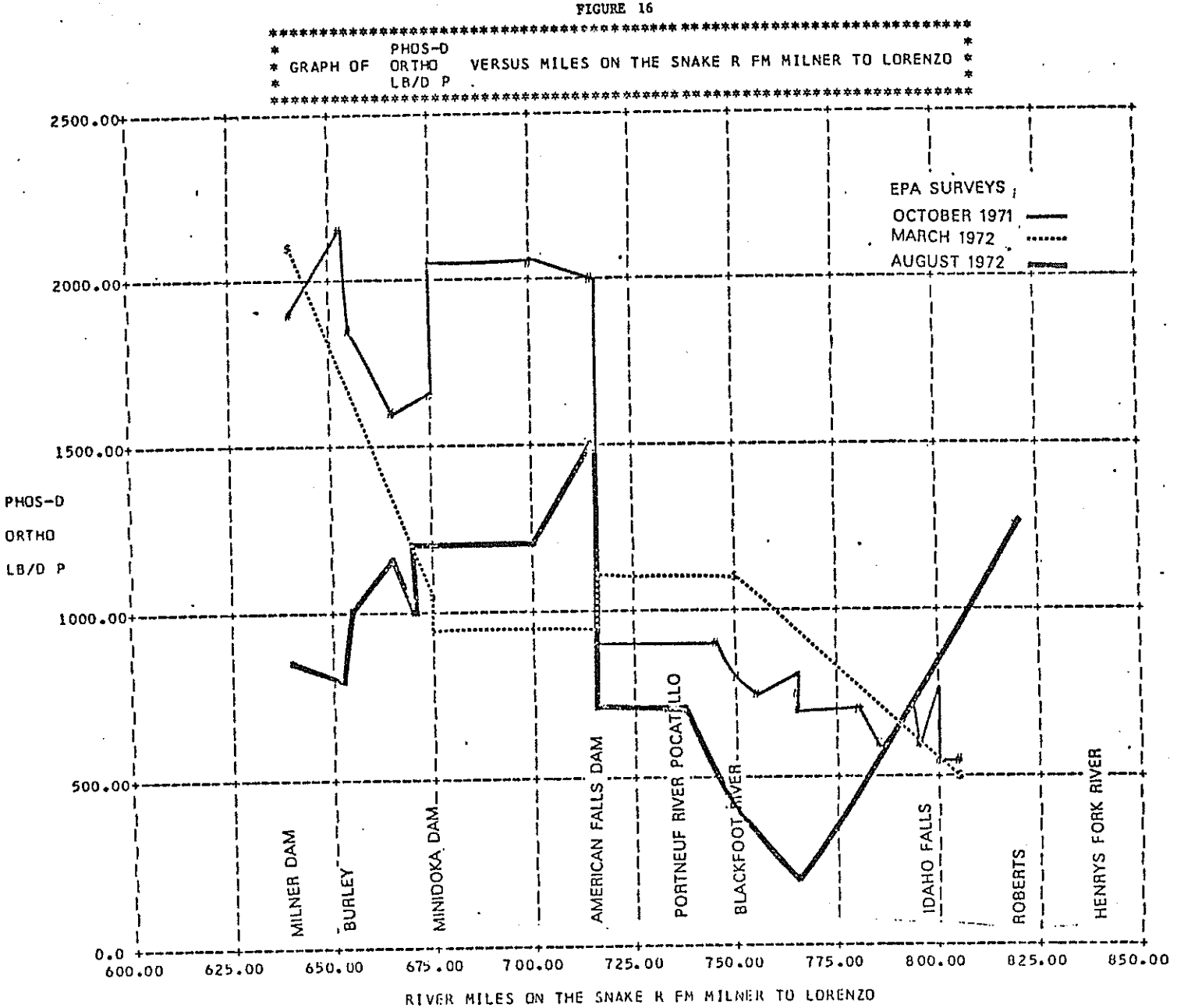

GRAPH OF PHOS-D ORTHO LB/D P VERSUS MILES ON THE SNAKE R FM MILNER TO LORENZO
EPA SURVEYS
OCTOBER 1971
MARCH 1972
AUGUST 1972
PHOS-D ORTHO LB/D P
2500.00
2000.00
1500.00
1000.00
500.00
0.0
600.00
625.00
650.00
675.00
700.00
725.00
750.00
775.00
800.00
825.00
850.00
MILNER DAM
BURLEY
MINIDOKA DAM
AMERICAN FALLS DAM
PORTNEUF RIVER
POCATELLO
BLACKFOOT RIVER
IDAHO FALLS
ROBERTS
HENRYS FORK RIVER
RIVER MILES ON THE SNAKE R FM MILNER TO LORENZO

FIGURE 17

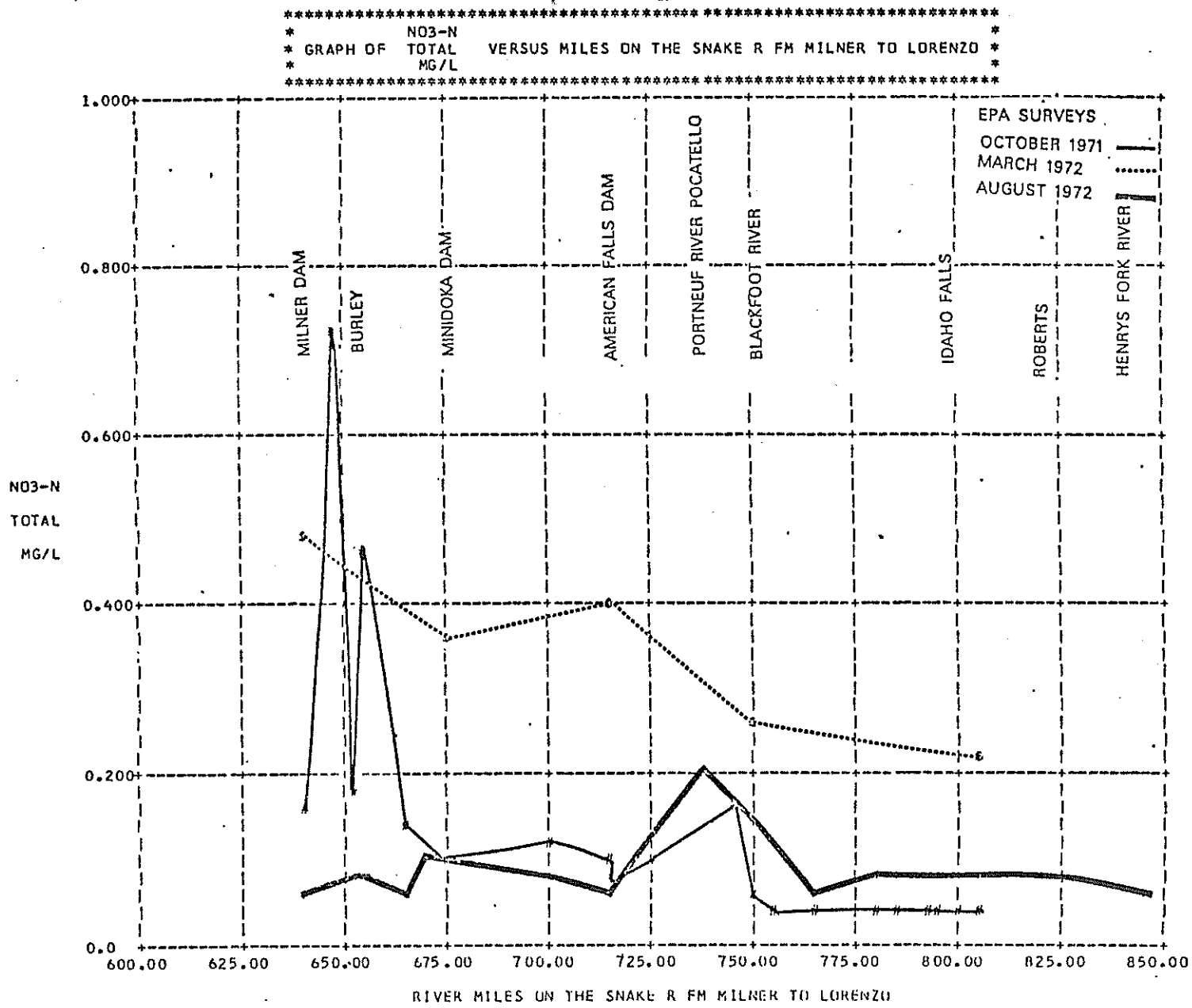

GRAPH OF NO3-N TOTAL MG/L VERSUS MILES ON THE SNAKE R FM MILNER TO LORENZO
EPA SURVEYS
OCTOBER 1971
MARCH 1972
AUGUST 1972
MILNER DAM
BURLEY
MINIDOKA DAM
AMERICAN FALLS DAM
PORTNEUF RIVER POCATELLO
BLACKFOOT RIVER
IDAHO FALLS
ROBERTS
HENRYS FORK RIVER
NO3-N TOTAL MG/L
1.000
0.800
0.600
0.400
0.200
0.0
600.00
625.00
650.00
675.00
700.00
725.00
750.00
775.00
800.00
825.00
850.00
RIVER MILES ON THE SNAKE R FM MILNER TO LORENZO

FIGURE 18

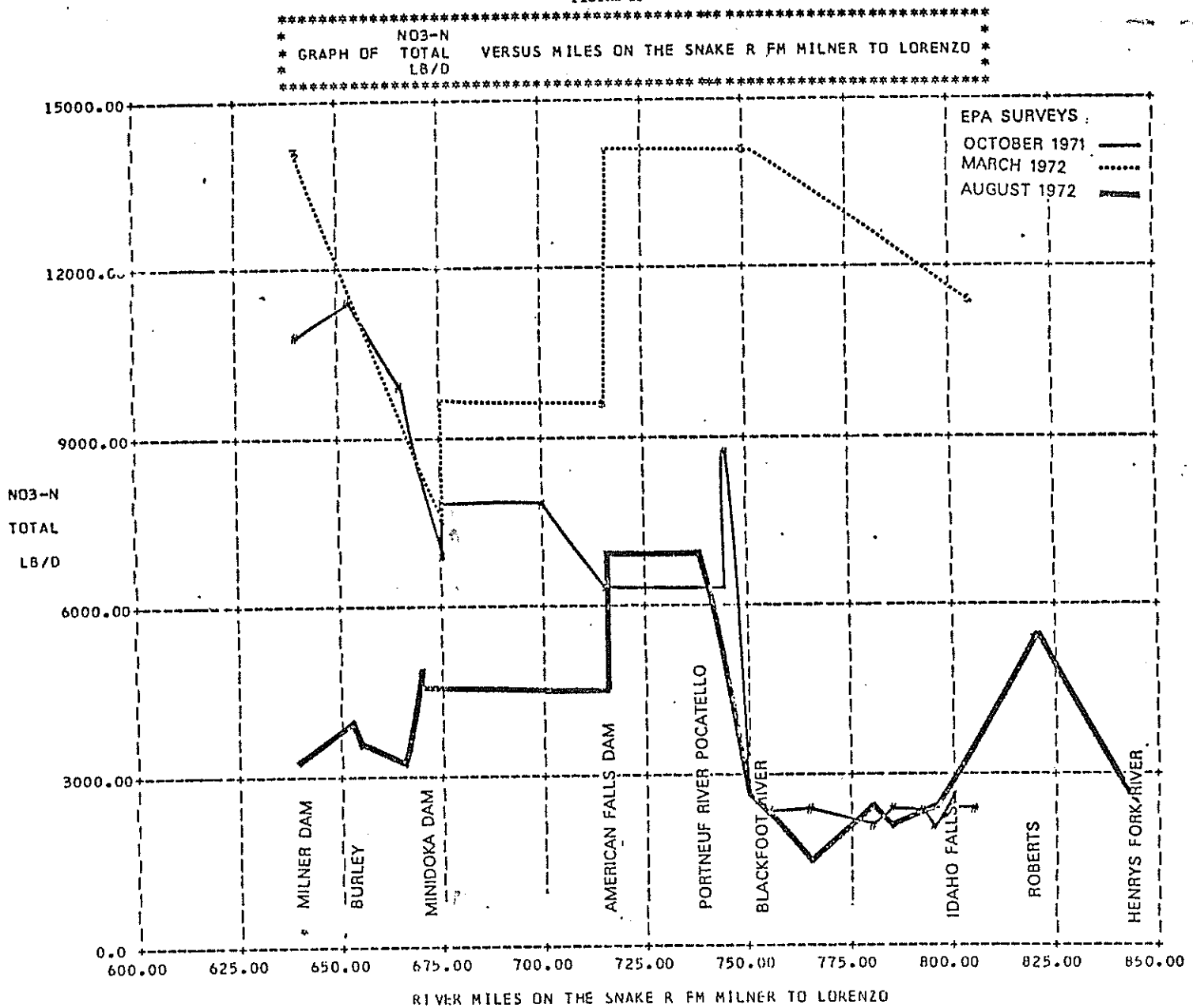

GRAPH OF NO3-N TOTAL LB/D VERSUS MILES ON THE SNAKE R FM MILNER TO LORENZO
EPA SURVEYS
OCTOBER 1971
MARCH 1972
AUGUST 1972
NO3-N TOTAL LB/D
15000.00
12000.00
9000.00
6000.00
3000.00
0.0
600.00
625.00
650.00
675.00
700.00
725.00
750.00
775.00
800.00
825.00
850.00
MILNER DAM
BURLEY
MINIDOKA DAM
AMERICAN FALLS DAM
PORTNEUF RIVER
POCATELLO
BLACKFOOT RIVER
IDAHO FALLS
ROBERTS
HENRYS FORK RIVER
RIVER MILES ON THE SNAKE R FM MILNER TO LORENZO

FIGURE 19

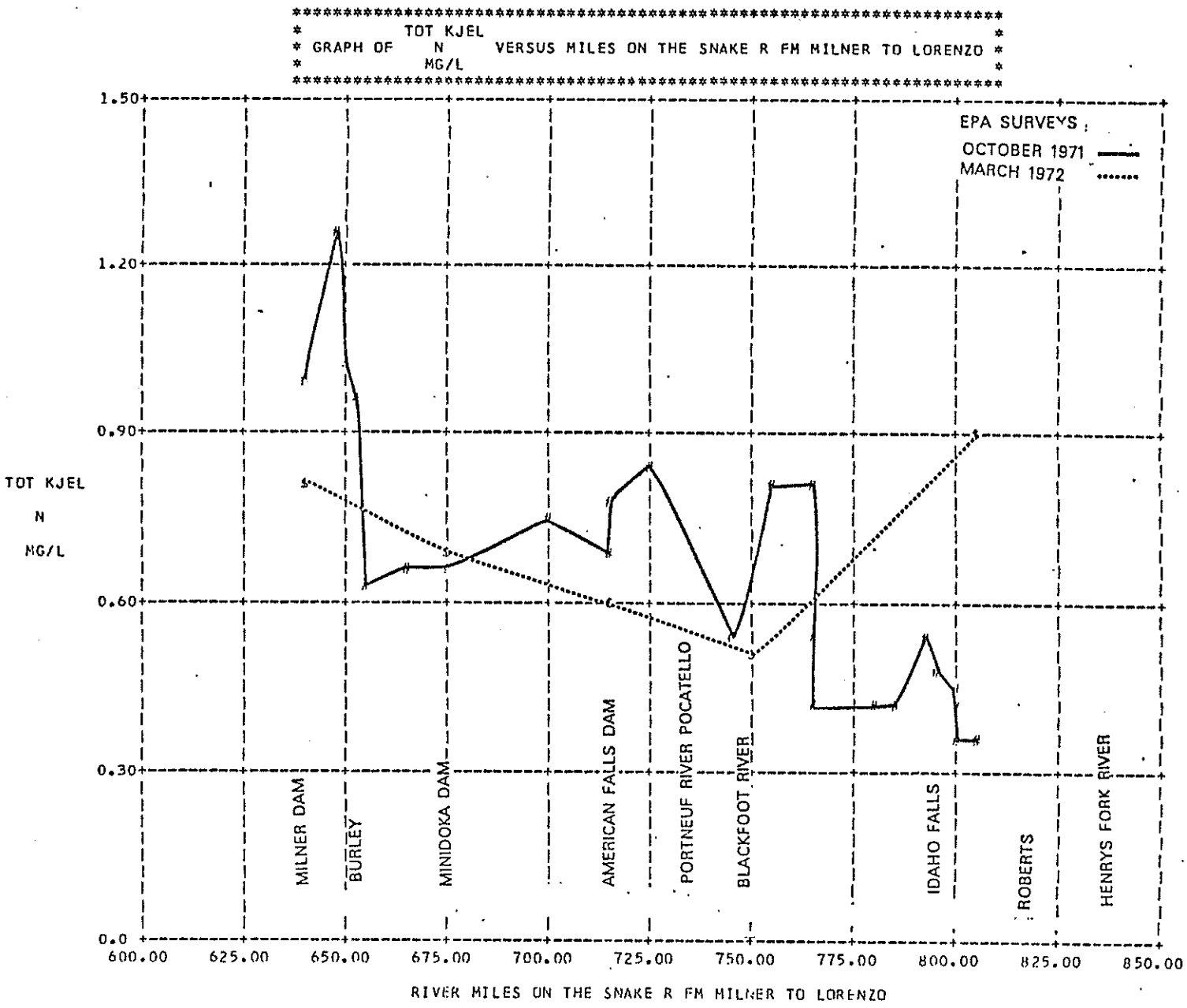

GRAPH OF TOT KJEL N MG/L VERSUS MILES ON THE SNAKE R FM MILNER TO LORENZO
EPA SURVEYS :
OCTOBER 1971
MARCH 1972
TOT KJEL N MG/L
1.50
1.20
0.90
0.60
0.30
0.0
600.00
625.00
650.00
675.00
700.00
725.00
750.00
775.00
800.00
825.00
850.00
MILNER DAM
BURLEY
MINIDOKA DAM
AMERICAN FALLS DAM
PORTNEUF RIVER
POCATELLO
BLACKFOOT RIVER
IDAHO FALLS
ROBERTS
HENRYS FORK RIVER
RIVER MILES ON THE SNAKE R FM MILNER TO LORENZO

FIGURE 20

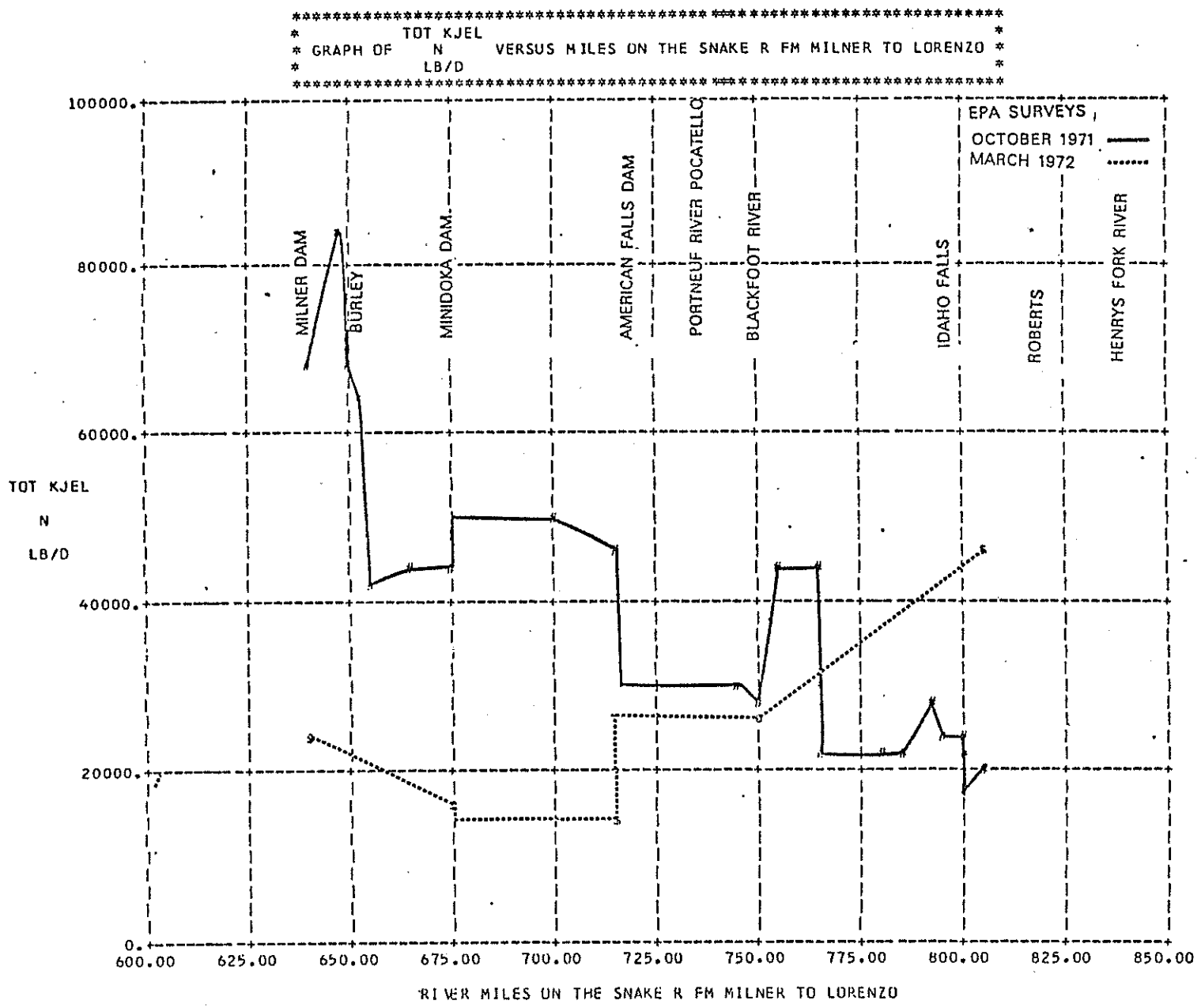

TOT KJEL
GRAPH OF N VERSUS MILES ON THE SNAKE R FM MILNER TO LORENZO
LB/D
EPA SURVEYS
OCTOBER 1971
MARCH 1972
MILNER DAM
BURLEY
MINIDOKA DAM
AMERICAN FALLS DAM
PORTNEUF RIVER POCATELLO
BLACKFOOT RIVER
IDAHO FALLS
ROBERTS
HENRYS FORK RIVER
TOT KJEL
N
LB/D
100000.
80000.
60000.
40000.
20000.
0.
600.00
625.00
650.00
675.00
700.00
725.00
750.00
775.00
800.00
825.00
850.00
RIVER MILES ON THE SNAKE R FM MILNER TO LORENZO

FIGURE 21

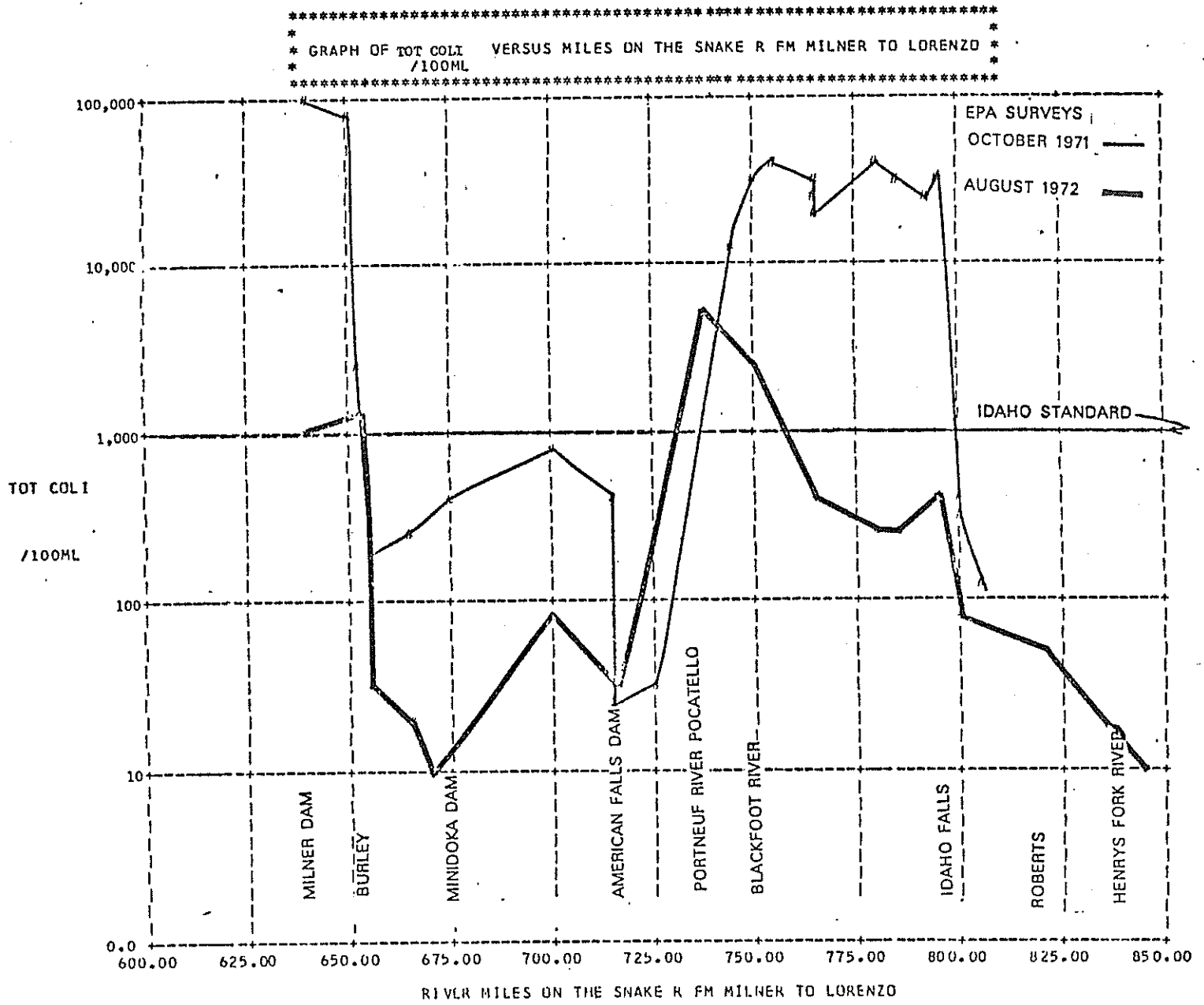

GRAPH OF TOT COLI /100ML VERSUS MILES ON THE SNAKE R FM MILNER TO LORENZO
EPA SURVEYS
OCTOBER 1971
AUGUST 1972
IDAHO STANDARD
TOT COLI /100ML
100,000
10,000
1,000
100
10
0.0
MILNER DAM
BURLEY
MINIDOKA DAM
AMERICAN FALLS DAM
PORTNEUF RIVER POCATELLO
BLACKFOOT RIVER
IDAHO FALLS
ROBERTS
HENRYS FORK RIVER
600.00
625.00
650.00
675.00
700.00
725.00
750.00
775.00
800.00
825.00
850.00
RIVER MILES ON THE SNAKE R FM MILNER TO LORENZO

FIGURE 22

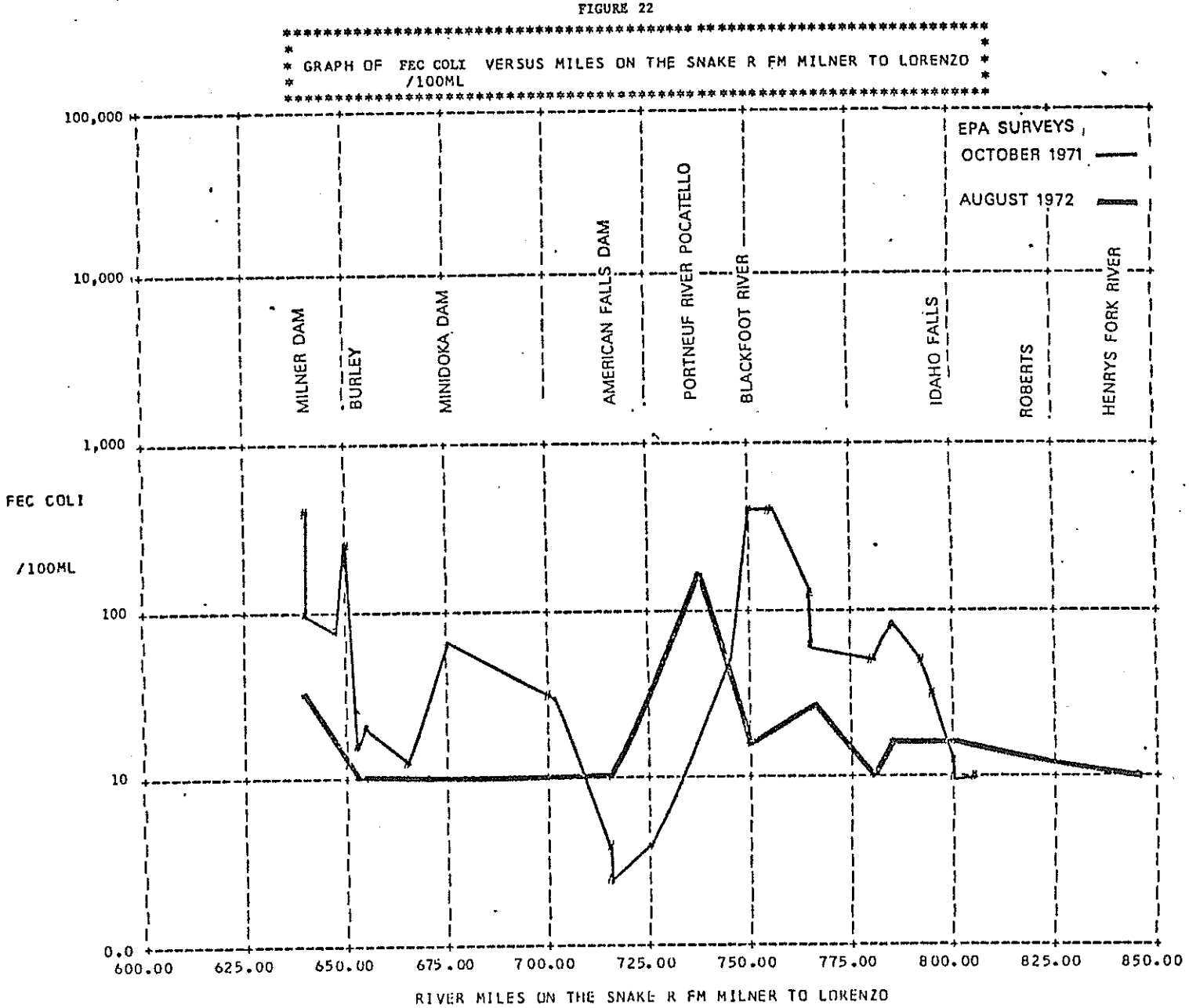

GRAPH OF FEC COLI /100ML VERSUS MILES ON THE SNAKE R FM MILNER TO LORENZO
EPA SURVEYS
OCTOBER 1971
AUGUST 1972
MILNER DAM
BURLEY
MINIDOKA DAM
AMERICAN FALLS DAM
PORTNEUF RIVER POCATELLO
BLACKFOOT RIVER
IDAHO FALLS
ROBERTS
HENRYS FORK RIVER
100,000
10,000
1,000
100
10
0.0
FEC COLI
/100ML
600.00
625.00
650.00
675.00
700.00
725.00
750.00
775.00
800.00
825.00
850.00
RIVER MILES ON THE SNAKE R FM MILNER TO LORENZO

FIGURE 23

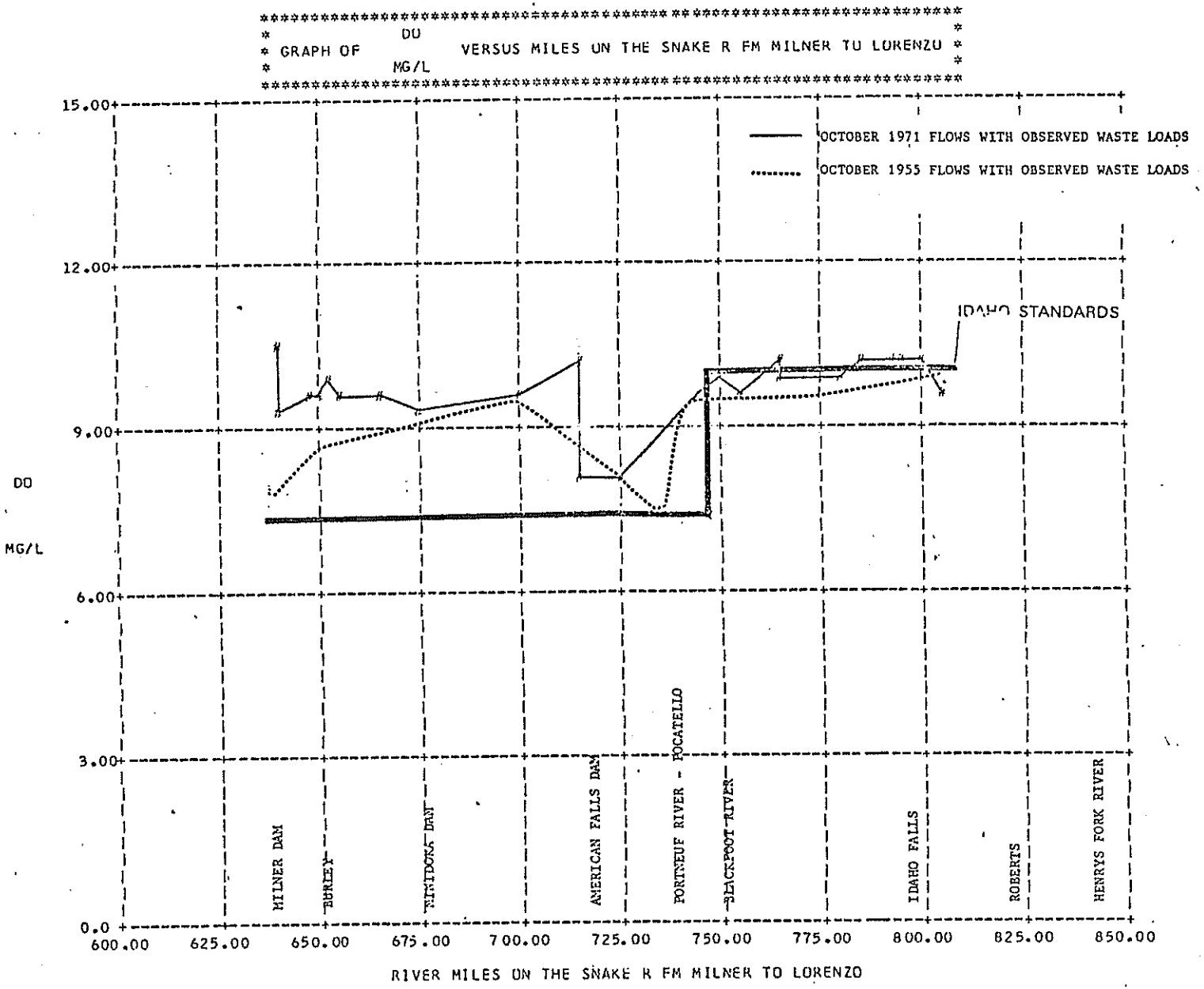

GRAPH OF DO MG/L VERSUS MILES ON THE SNAKE R FM MILNER TO LORENZO
OCTOBER 1971 FLOWS WITH OBSERVED WASTE LOADS
OCTOBER 1955 FLOWS WITH OBSERVED WASTE LOADS
IDAHO STANDARDS
DO
MG/L
15.00
12.00
9.00
6.00
3.00
0.0
600.00
625.00
650.00
675.00
700.00
725.00
750.00
775.00
800.00
825.00
850.00
MILNER DAM
BURLEY
MINIDOKA DAM
AMERICAN FALLS DAM
PORTNEUF RIVER
POCATELLO
BLACKFOOT RIVER
IDAHO FALLS
ROBERTS
HENRYS FORK RIVER
RIVER MILES ON THE SNAKE R FM MILNER TO LORENZO

FIGURE 24

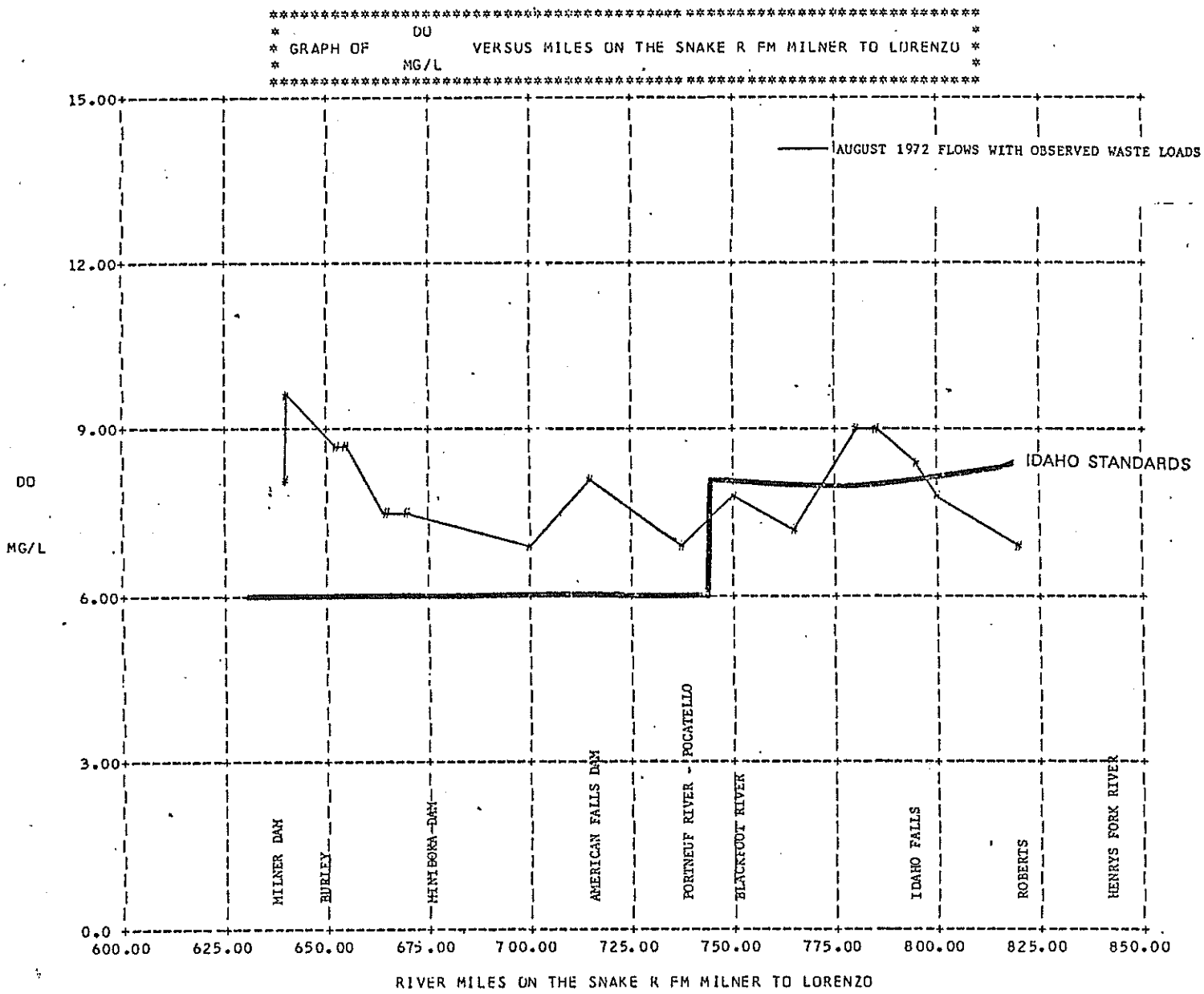

GRAPH OF DO MG/L VERSUS MILES ON THE SNAKE R FM MILNER TO LORENZO
AUGUST 1972 FLOWS WITH OBSERVED WASTE LOADS
IDAHO STANDARDS
DO
MG/L
15.00
12.00
9.00
6.00
3.00
0.0
600.00
625.00
650.00
675.00
700.00
725.00
750.00
775.00
800.00
825.00
850.00
MILNER DAM
BURLEY
HIMBORA DAM
AMERICAN FALLS DAM
PORTNEUF RIVER
POCATELLO
BLACKFOOT RIVER
IDAHO FALLS
ROBERTS
HENRYS FORK RIVER
RIVER MILES ON THE SNAKE R FM MILNER TO LORENZO

FIGURE 25

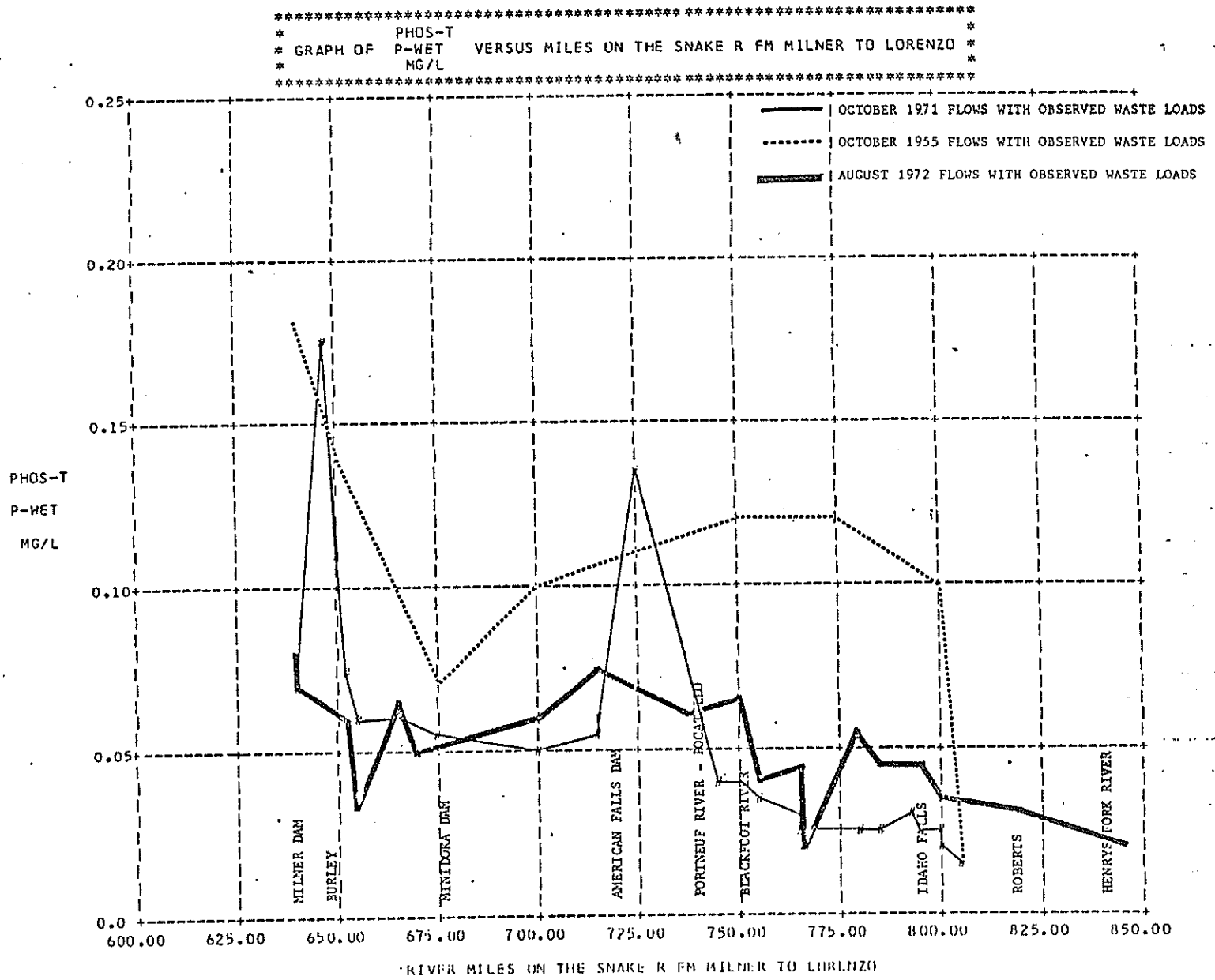

PHOS-T
P-WET
MG/L
VERSUS MILES ON THE SNAKE R FM MILNER TO LORENZO
OCTOBER 1971 FLOWS WITH OBSERVED WASTE LOADS
OCTOBER 1955 FLOWS WITH OBSERVED WASTE LOADS
AUGUST 1972 FLOWS WITH OBSERVED WASTE LOADS
0.25
0.20
0.15
0.10
0.05
0.0
600.00
625.00
650.00
675.00
700.00
725.00
750.00
775.00
800.00
825.00
850.00
MILNER DAM
BURLEY
MINIDOKA DAM
AMERICAN FALLS DAM
PORTNEUF RIVER - POCATELLO
BLACKFOOT RIVER
IDAHO FALLS
ROBERTS
HENRYS FORK RIVER
RIVER MILES ON THE SNAKE R FM MILNER TO LORENZO

FIGURE 26

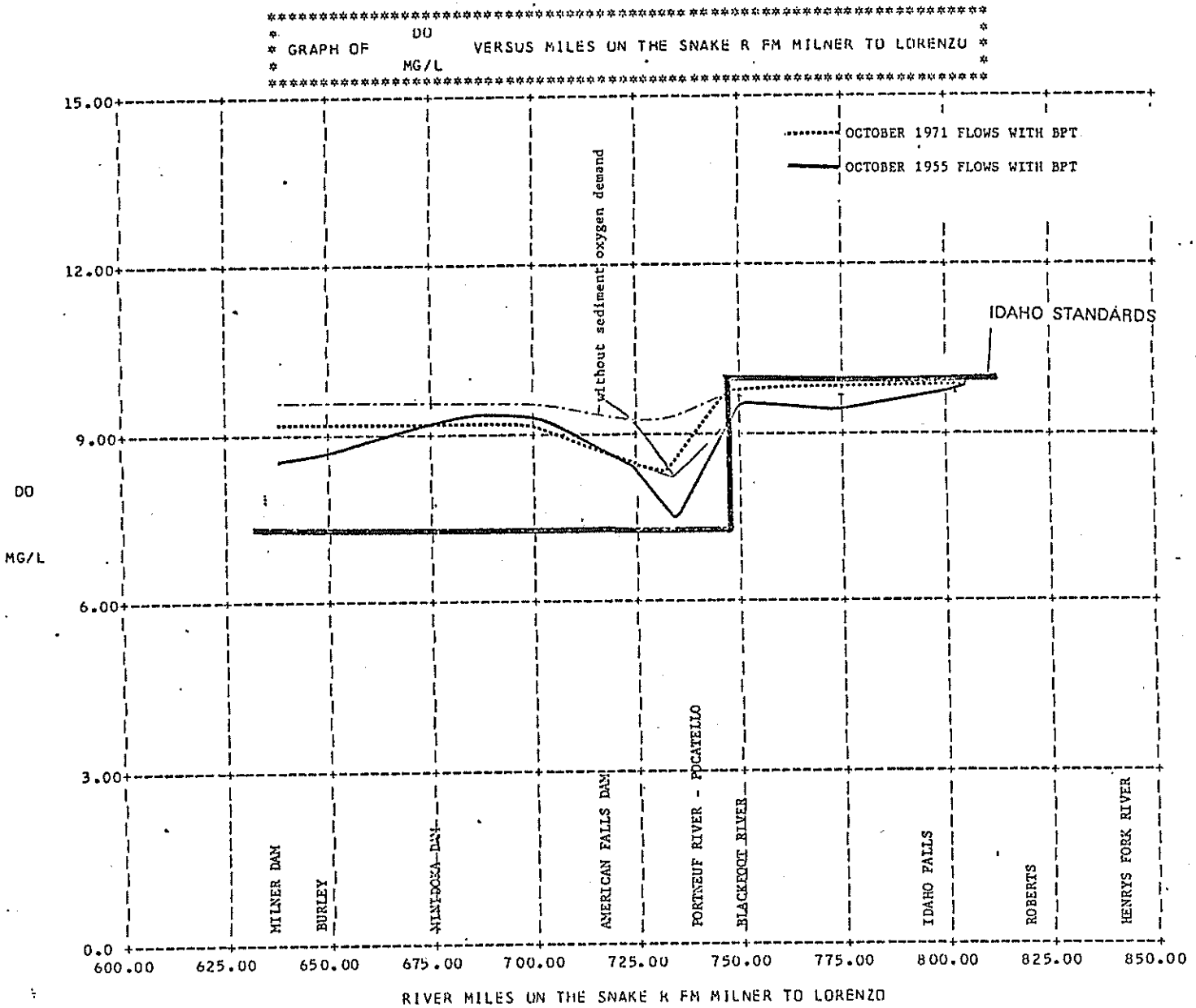

GRAPH OF DO MG/L VERSUS MILES ON THE SNAKE R FM MILNER TO LORENZO
OCTOBER 1971 FLOWS WITH BPT
OCTOBER 1955 FLOWS WITH BPT
without sediment oxygen demand
IDAHO STANDARDS
15.00
12.00
9.00
6.00
3.00
0.0
DO
MG/L
MILNER DAM
BURLEY
MINIDOKA DAM
AMERICAN FALLS DAM
PORTNEUF RIVER - POCATELLO
BLACKFOOT RIVER
IDAHO FALLS
ROBERTS
HENRYS FORK RIVER
600.00
625.00
650.00
675.00
700.00
725.00
750.00
775.00
800.00
825.00
850.00
RIVER MILES ON THE SNAKE R FM MILNER TO LORENZO

FIGURE 27

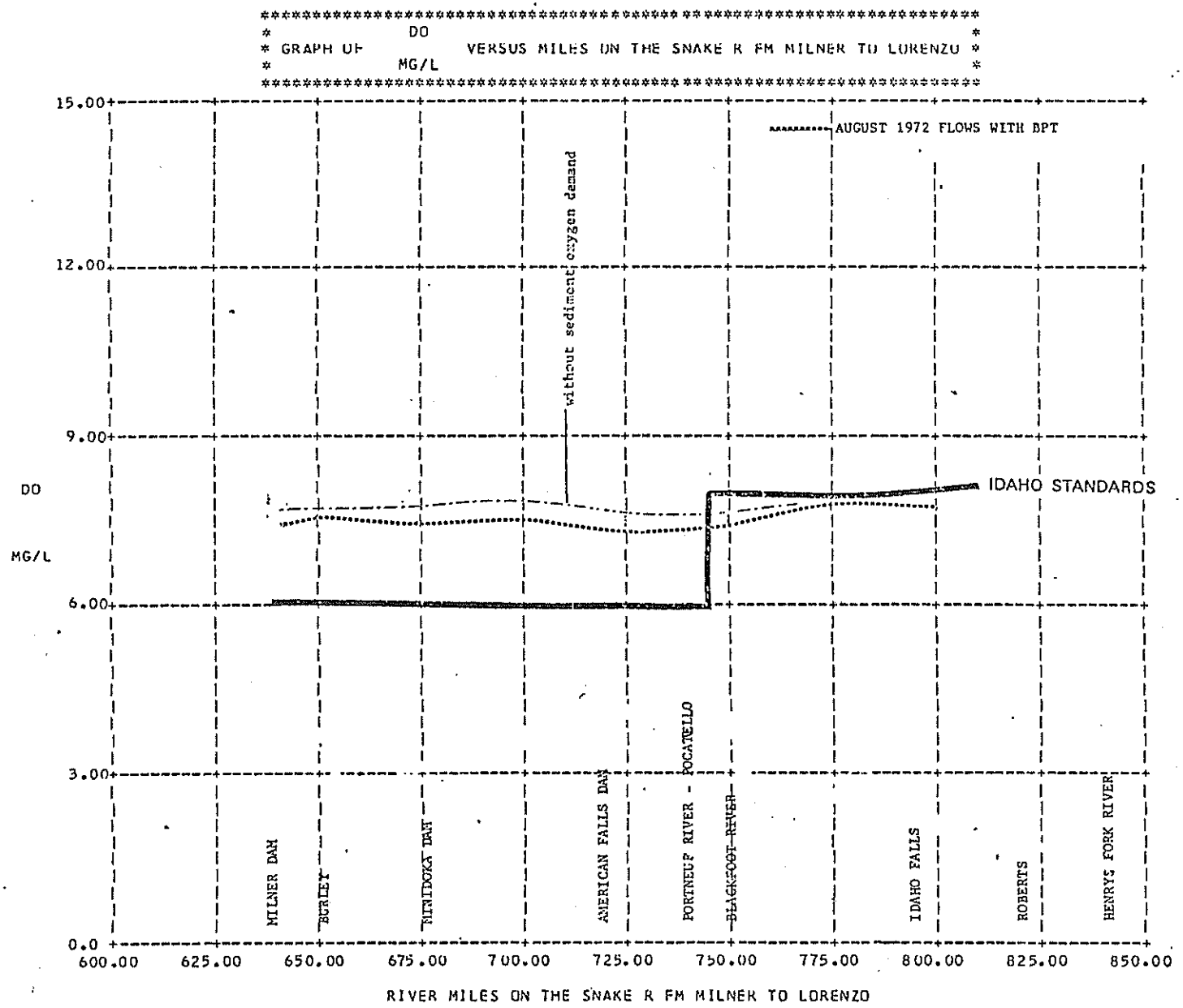

GRAPH OF DO MG/L VERSUS MILES ON THE SNAKE R FM MILNER TO LORENZO
AUGUST 1972 FLOWS WITH BPT
without sediment oxygen demand
IDAHO STANDARDS
DO
MG/L
15.00
12.00
9.00
6.00
3.00
0.0
600.00
625.00
650.00
675.00
700.00
725.00
750.00
775.00
800.00
825.00
850.00
MILNER DAM
BURLEY
BLINDOKA DAM
AMERICAN FALLS DAM
POCATELLO
PORTNEUF RIVER
BLACKFOOT RIVER
IDAHO FALLS
ROBERTS
HENRYS FORK RIVER
RIVER MILES ON THE SNAKE R FM MILNER TO LORENZO

FIGURE 28

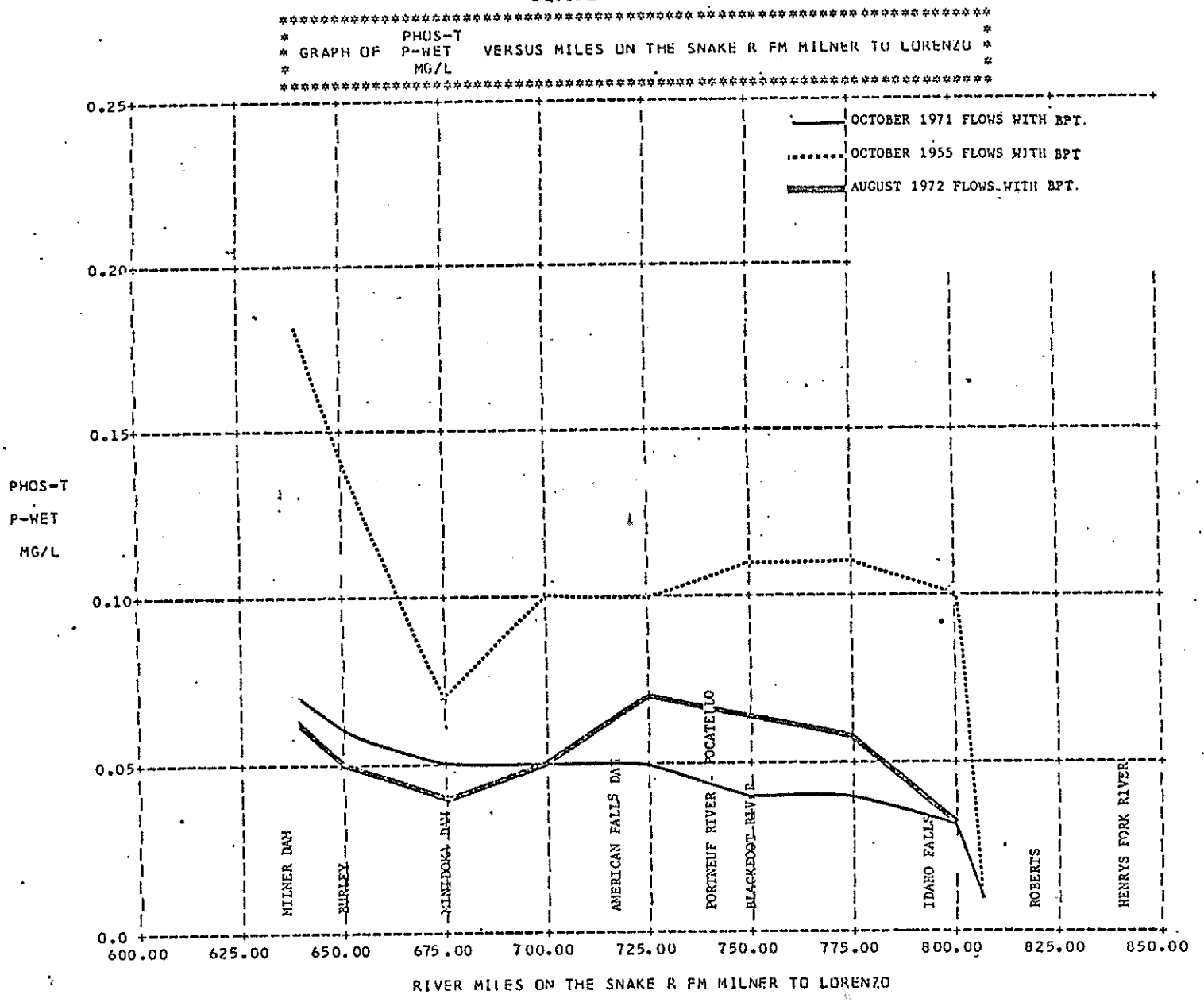

GRAPH OF PHOS-T P-WET MG/L VERSUS MILES ON THE SNAKE R FM MILNER TO LORENZO
OCTOBER 1971 FLOWS WITH BPT.
OCTOBER 1955 FLOWS WITH BPT
AUGUST 1972 FLOWS WITH BPT.
PHOS-T
P-WET
MG/L
0.25
0.20
0.15
0.10
0.05
0.0
600.00
625.00
650.00
675.00
700.00
725.00
750.00
775.00
800.00
825.00
850.00
MILNER DAM
BURLEY
AMERICAN FALLS DAM
POCATELLO
BLACKFOOT RIVER
IDAHO FALLS
ROBERTS
HENRYS FORK RIVER
RIVER MILES ON THE SNAKE R FM MILNER TO LORENZO

FIGURE 29

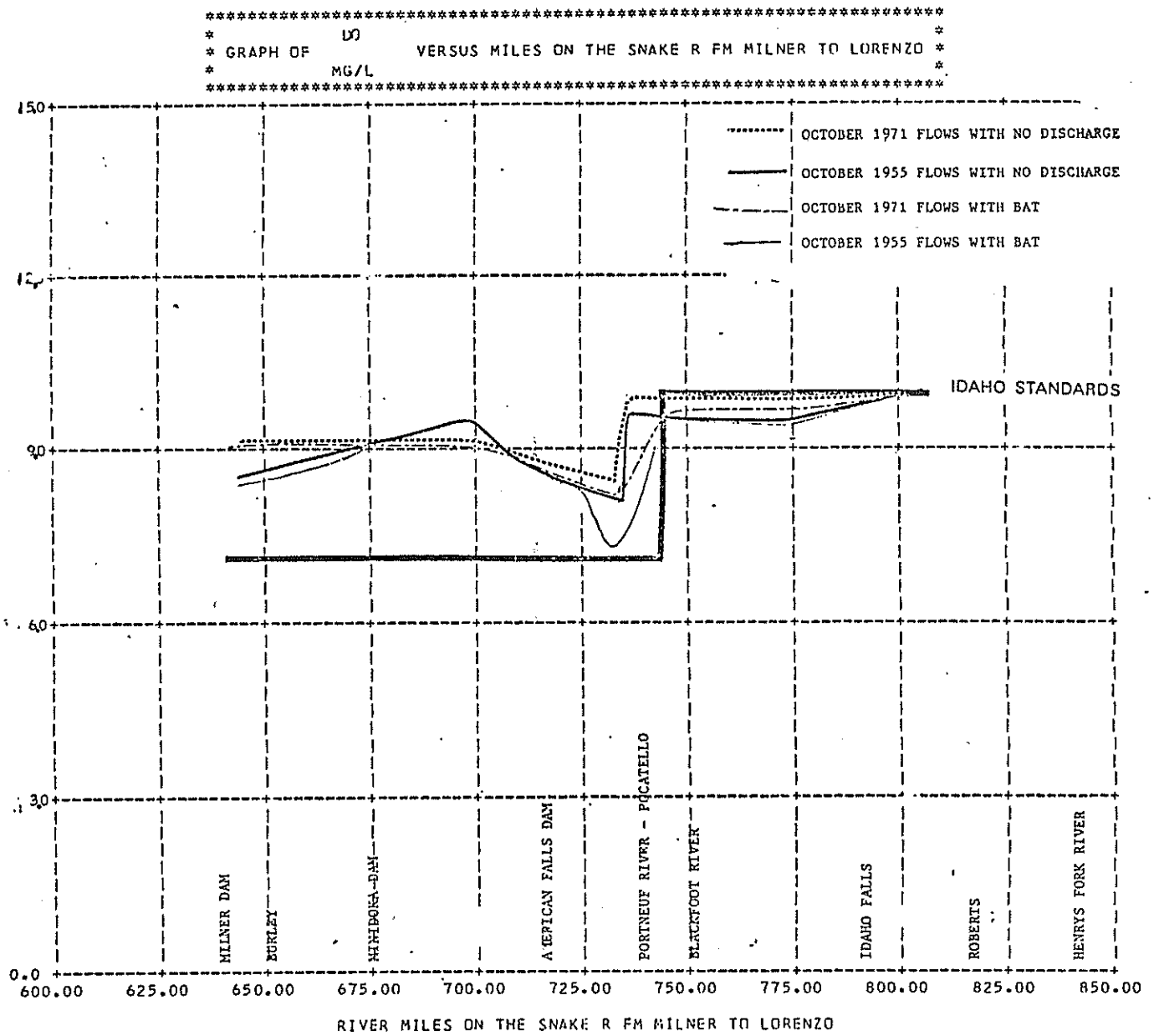

GRAPH OF DO MG/L VERSUS MILES ON THE SNAKE R FM MILNER TO LORENZO
OCTOBER 1971 FLOWS WITH NO DISCHARGE
OCTOBER 1955 FLOWS WITH NO DISCHARGE
OCTOBER 1971 FLOWS WITH BAT
OCTOBER 1955 FLOWS WITH BAT
IDAHO STANDARDS
DO
MG/L
15.0
12.0
9.0
6.0
3.0
0.0
MILNER DAM
BURLEY
MINIDOKA DAM
AMERICAN FALLS DAM
PORTNEUF RIVER - POCATELLO
BLACKFOOT RIVER
IDAHO FALLS
ROBERTS
HENRYS FORK RIVER
600.00
625.00
650.00
675.00
700.00
725.00
750.00
775.00
800.00
825.00
850.00
RIVER MILES ON THE SNAKE R FM MILNER TO LORENZO

FIGURE 30

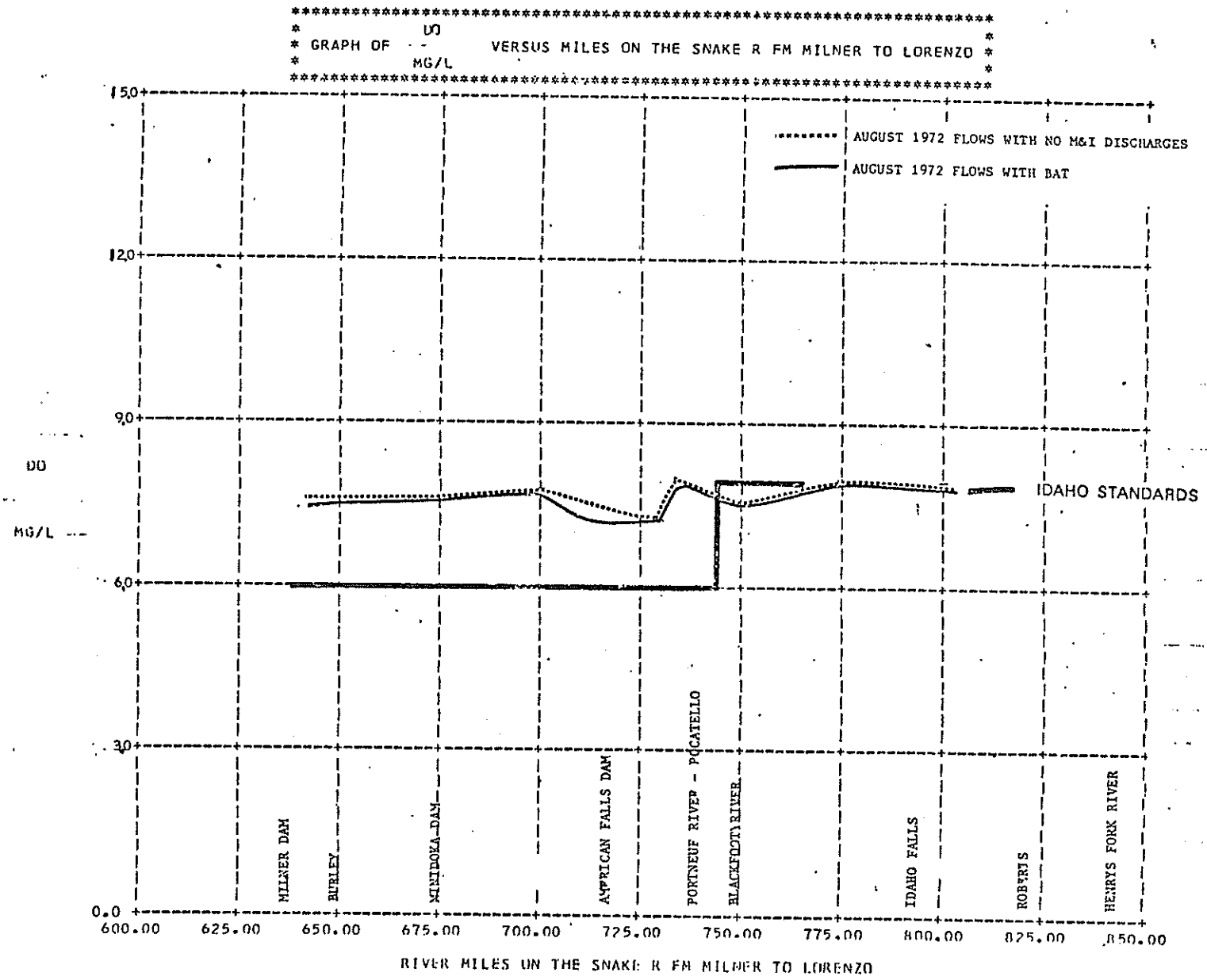

GRAPH OF DO MG/L VERSUS MILES ON THE SNAKE R FM MILNER TO LORENZO
AUGUST 1972 FLOWS WITH NO M&I DISCHARGES
AUGUST 1972 FLOWS WITH BAT
IDAHO STANDARDS
DO MG/L
15.0
12.0
9.0
6.0
3.0
0.0
MILNER DAM
BURLEY
MINIDOKA DAM
AMERICAN FALLS DAM
PORTNEUF RIVER - POCATELLO
BLACKFOOT RIVER
IDAHO FALLS
ROBERTS
HENRYS FORK RIVER
600.00
625.00
650.00
675.00
700.00
725.00
750.00
775.00
800.00
825.00
850.00
RIVER MILES ON THE SNAKE R FM MILNER TO LORENZO

FIGURE 31

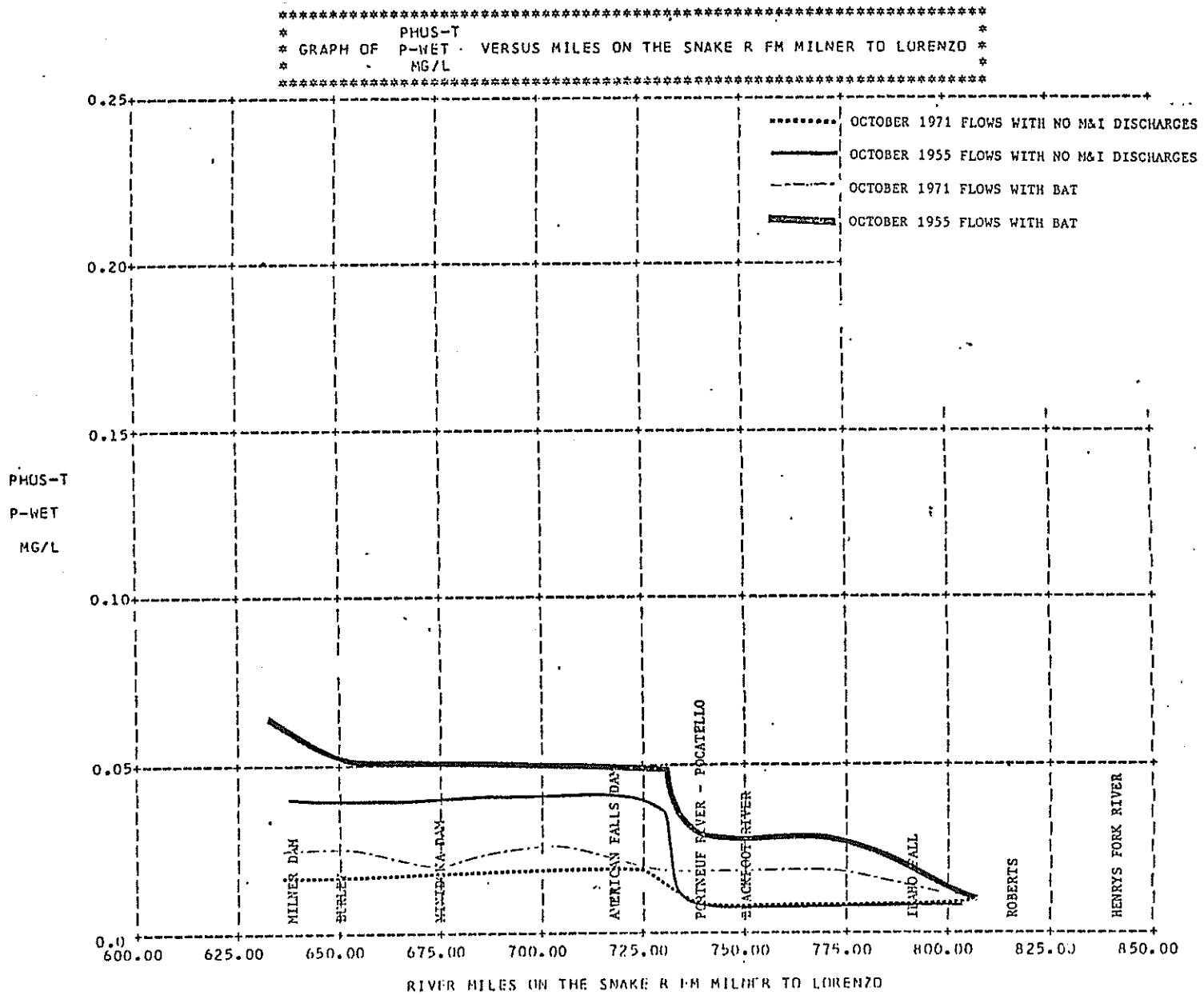
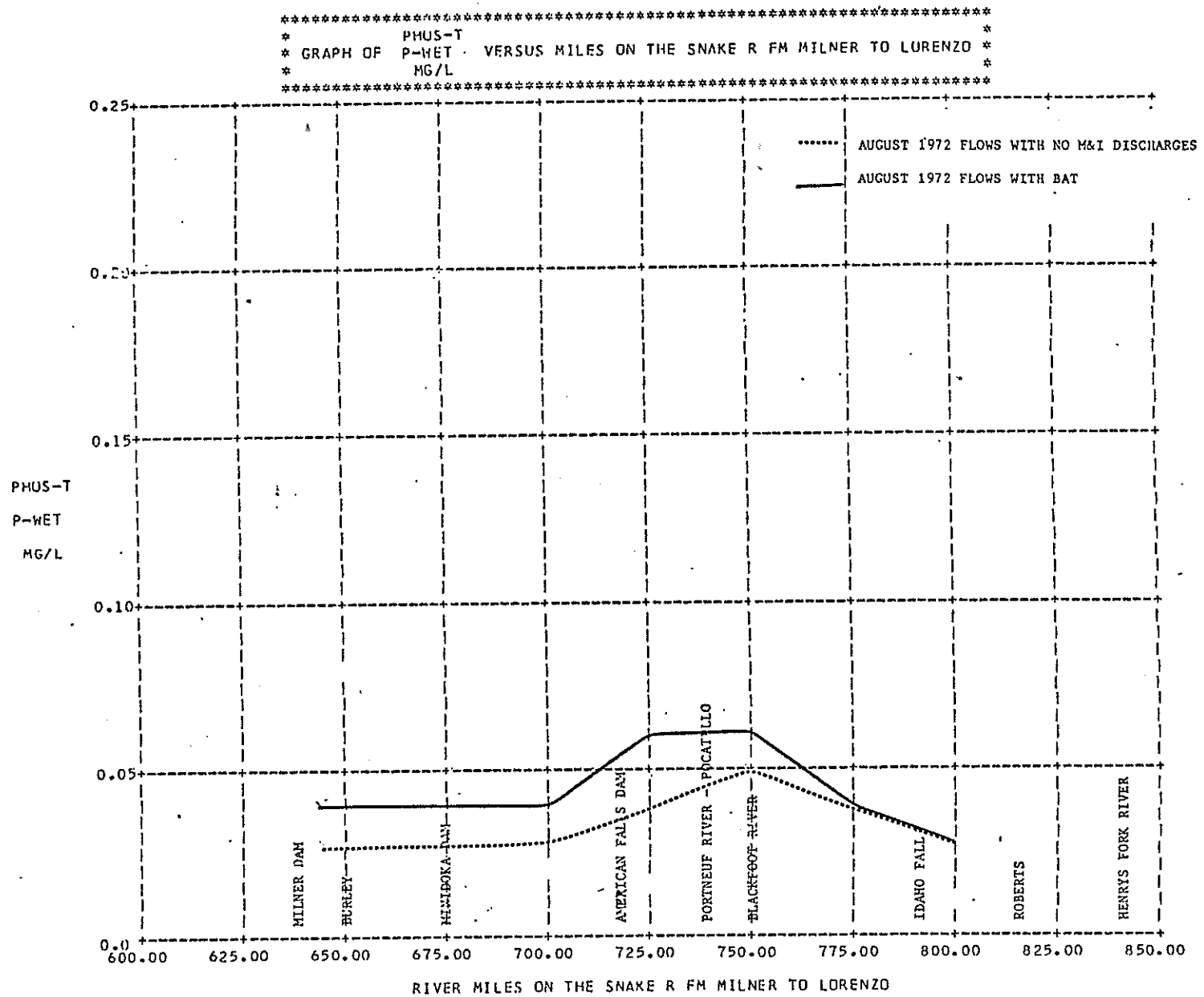

PHUS-T
P-WET
MG/L
VERSUS MILES ON THE SNAKE R FM MILNER TO LORENZO
OCTOBER 1971 FLOWS WITH NO M&I DISCHARGES
OCTOBER 1955 FLOWS WITH NO M&I DISCHARGES
OCTOBER 1971 FLOWS WITH BAT
OCTOBER 1955 FLOWS WITH BAT
0.25
0.20
0.15
0.10
0.05
0.0
600.00
625.00
650.00
675.00
700.00
725.00
750.00
775.00
800.00
825.00
850.00
MILNER DAM
AMERICAN FALLS DAM
POCATELLO
ROBERTS
HENRYS FORK RIVER
RIVER MILES ON THE SNAKE R FM MILNER TO LORENZO

FIGURE 32


GRAPH OF PHUS-T P-WET MG/L VERSUS MILES ON THE SNAKE R FM MILNER TO LORENZO
AUGUST 1972 FLOWS WITH NO M&I DISCHARGES
AUGUST 1972 FLOWS WITH BAT
PHUS-T
P-WET
MG/L
0.25
0.20
0.15
0.10
0.05
0.0
600.00
625.00
650.00
675.00
700.00
725.00
750.00
775.00
800.00
825.00
850.00
MILNER DAM
BURLEY
HEYBURN DAM
AMERICAN FALLS DAM
PORTNEUF RIVER
POCATELLO
BLACKFOOT RIVER
IDAHO FALLS
ROBERTS
HENRYS FORK RIVER
RIVER MILES ON THE SNAKE R FM MILNER TO LORENZO

APPENDIX C

MONITORING PROGRAM

Current Surveillance Activities

Monitoring Stations -- The USGS and State of Idaho as well as the EPA all have water quality monitoring stations on the Upper Snake. Also, Idaho State University has conducted some water quality surveys on the Snake River.

United States Geological Survey (USGS) -- The existing system of USGS surface water quality monitoring stations in the Upper Snake is presented in Table I. Six of these stations are directly supported by EPA during FY 1973.

The USGS is funded by other agencies to obtain surface water quality and quantity information routinely at many locations. A number of ground-water studies have also been performed in this area mostly in cooperation with the Idaho Department of Water Administration. Much of this data is available through the STORET (STOrage and RETrival) system. Additional data not in STORET can be obtained from the USGS.

Idaho Department of Environmental Protection & Health (IDEPH) -- The existing system of monitoring stations as obtained from STORET is presented in Table II. All the stations listed are part of the State network but many are not sampled on a regular basis. The State conducts a number of special water quality surveys which involve stream and

municipal and industrial effluent sampling. Data from these special studies are not now in STORET. Efforts will be made to obtain and store this data.

Idaho State University -- Results from surveys made by Idaho State University on the Upper Snake River are available and efforts will be made to obtain them and enter pertinent data into STORET.

Environmental Protection Agency (EPA) -- The existing system of EPA monitoring stations in the Upper Snake River Basin is presented in Tables III, IV, and V for river, tributary, and industrial-municipal stations, respectively. It should be noted that all of these stations are not sampled on a regular basis. Existing monitoring strategy dictates the performance of intensive surveys to answer specific questions regarding water quality problems. In-stream, municipal and industrial effluents, and biological stations are utilized to accomplish specific survey purposes. Routine monitoring at set locations on set frequencies for the purpose of obtaining long-term water quality information is no longer directly accomplished by EPA personnel. EPA does, however, provide funds to the USGS for this purpose. All EPA surveillance data in this basin is stored in the STORET system and is available upon request.

Intensive Monitoring Surveys -- Three intensive monitoring surveys have been conducted in the Upper Snake River Basin by the EPA. These surveys were conducted during October 1971, March 1972, and August 1972. The

purposes of the surveys were to (1) determine water quality in the river from above Idaho Falls to Milner Dam, and (2) identify and characterize waste sources contributing to the water quality of the Snake River.

October 1971 Survey -- Figures 1 and 2 show locations of points sampled during the October 1971 survey in the Snake River and several tributaries and of industrial and municipal effluents, respectively. The October 1971 survey was conducted during the early part of the food processing season and all major industrial effluents and significant municipal effluents were included in the survey sampling program.

March 1972 Survey -- The description and locations of sampling stations during the March 1972 survey are shown in Table VI and Figure 3, respectively. The March 1972 survey was conducted during the latter part of the food processing season. This survey was not as extensive as the October 1971 survey as only river water quality data is presented in this report. Industrial and municipal effluent sampling was conducted at several plants and the data is available upon request.

August 1972 Survey -- The description and locations of sampling stations during the August 1972 survey are shown in Table VII and Figure 4, respectively. This survey was conducted during the irrigation season and included sampling of all significant operating industrial effluents, significant municipal effluents, and a large number of irrigation returns, canals, springs, creeks, and other inputs into the Snake River.

Biological Monitoring -- Benthic Macroinvertebrates: Stations utilizing artificial substrates have been established on free flowing portions of the Upper Snake River and several tributaries. Samples collected from these stations will be used to develop a diversity and a population density measurement. These biological measurements will establish a baseline and serve as an indicator of the response of the aquatic community to pollution control measures being implemented in the basin. The stations as they existed on January 25, 1973 are as follows:

Snake River at Lorenzo	RM 844.0
Henrys Fork River upstream of St. Anthony	837.4/34.0
Snake River at Roberts	819.0
Snake River below Idaho Falls	795.0
Snake River at Shelley	785.5
Snake River at Blackfoot	763.8
Blackfoot River near Mouth	751.2/0.1
Snake River at Tilden Bridge	751.0
Portneuf River above Inkom	736.0/-
Portneuf River below Pocatello	736.0/11.7
Snake River below Milner Dam	639.7

Algal Productivity -- Extensive algal growth potential tests and productivity assessments will be undertaken in the spring and summer of 1973. A large portion of this effort will be expended on the Snake River above Idaho Falls, American Falls Reservoir, Lake Walcott, and Milner Reservoir. Also, these studies will assess the algal growth potential and effect on algal growth problems in the impoundments of the Upper Snake River, several representative municipal and industrial effluents, and irrigation return flows.

Bioassay -- Live box studies and other bioassay techniques will be undertaken in stream and on effluents when toxicity problems are indicated; however, bioassay tests are not presently indicated or planned.

Proposed Surveillance Activities

The inventory and water quality data presented in this report have provided enough information to formulate a preliminary water quality model of the Upper Snake and to define the basin problems and problem areas. The new surveillance program is designed to document the effects of seasonal industrial and agricultural practices on the water quality of the Upper Snake River.

The FY 1973 and 1974 surveillance program should consist of intensive surveys in March 1973, August 1973, and October 1973, a cooperative water quality program with the USGS, and a continuing biological program. As the surveys are completed and the data reviewed, model refinement and additional needs will direct the extent of additional surveillance in this basin. The new surveillance program is not to be interpreted as a continuously annual station sampling program.

Water Quality Monitoring -- Intensive Surveys: Intensive water quality surveys will be conducted in (1) Henrys Fork Basin, (2) Snake River from Lorenzo to Palisades Reservoir, (3) Portneuf River above Pocatello to Lava Hot Springs, and (4) Snake River reservoirs.

Objectives of the first three surveys above are as follows:

1. Determination of instream water quality. Parameters include (a) bacteria, (b) nutrients, (c) BOD, (d) dissolved oxygen, (e) suspended solids and turbidity, and (f) pesticides.

2. Determination of sources of waste loads. Sources include (a) industrial, (b) municipal, (c) agricultural, and (d) natural sources.

These surveys should be conducted during March, August, and October. These months correspond with the late food processing season, irrigation season, and early food processing season, respectively.

Objectives of the surveys in the Snake River Reservoirs (Milner, Minidoka, and American Falls) are as follows:

1. Determination of water quality within the reservoirs (surface to depth). Parameters include (a) dissolved oxygen, (b) BOD, (c) nutrients, (d) suspended solids, (e) turbidity, and (f) algal assay.
2. Determination of sediment oxygen demand and its effects upon the reservoirs' dissolved oxygen levels.
3. Determination of the quantity and distribution of phosphorus in the reservoirs' sediments and rate of sediment phosphorus release to overlying waters.

These surveys will be conducted during late summer or early fall.

In addition to the above intensive surveys, studies should be conducted to determine sources of nutrients in the many irrigation returns and tributaries (all sources other than municipal and industrial). The objective of these studies would be to determine if the sources are controllable or noncontrollable.

Long Term Monitoring -- The cooperative long term monitoring program with the USGS will include monthly samples at the following locations:

Snake River at Heise, Idaho	RM 851.8
Henrys Fork River near Rexburg	837.4/9.3
Snake River above Idaho Falls	800.8
Snake River below Idaho Falls	795.0
Snake River at Tilden Bridge	751.0
Portneuf River above Pocatello	736.0/17.0
Portneuf River below Pocatello	736.0/11.7
Snake River below American Falls Dam	714.0
Snake River 5 miles E. Heyburn	
Snake River below Milner Dam	639.7

Samples will be analyzed for the following parameters:

Nutrients
Dissolved Oxygen
BOD
Metals
Bacteria
Pesticides
Suspended Solids

Biological Monitoring -- The biological monitoring program will continue as outlined in the previous Current Surveillance Activities section.