WATER QUALITY STATUS REPORT

INDIAN CREEK
(Canyon County)

1976-1977

Idaho Department of Health and Welfare
Division of Environment
Statehouse
Boise, Idaho 83720

May 1979

Report No. WQ-42

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Data Collected By:

William H. Clark

Report By:

Donald M. Martin

&

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ABSTRACT

The Indian Creek (Ada and Canyon Counties) drainage is located in the Boise River Basin of Southwest Idaho. This study was concerned with that portion of Indian Creek in Canyon County. The lower reach of Indian Creek is classified as Class B and is protected for uses as industrial water supply, irrigation, livestock watering, other fishing and aquatic life, hunting, wildlife and aesthetics. The study was conducted between December 1976 and August 1977.

Two major point sources discharge to the stream in the study area. These sources were found to elevate instream temperatures, depress dissolved oxygen concentrations, add heavy organic loadings, provide excessive nutrient loads, discharge toxic levels of ammonia and residual chlorine, and cause bacterial contamination. Nonpoint sources such as individual on-site sewage systems, irrigation return flows, animal feeding operations, and urban storm runoff could also be affecting the pollutant load of Indian Creek by adding increased turbidity, sediment, nutrients, and elevated bacteria levels.

Indian Creek is classified as water quality limiting because of bacterial, nutrient, ammonia, dissolved oxygen and total residual chlorine violations of Idaho's instream water quality standards and criteria.

The City of Nampa wastewater treatment plant should be upgraded for further treatment and removal of BOD_5, ammonia, bacteria, and residual chlorine. In addition, the dissolved oxygen concentration of the Nampa effluent should be increased to prevent standards violations.

ACKNOWLEDGEMENTS

We gratefully acknowledge the assistance of Will Reid with Region 3 of the Idaho Department of Fish and Game who conducted the live-box studies on Indian Creek. Also, we would like to thank the City of Nampa for the use of their laboratory facilities.

INTRODUCTION

Drainage Description

The Indian Creek drainage is located in the Boise River Basin of Southwest Idaho. The stream's headwaters are in the Danskin Mountains north of Mountain Home and it flows in a west-southwest direction to Indian Creek Reservoir near Interstate 80. From Indian Creek Reservoir the drainage turns west-northwest, skirts Kuna, and flows through Nampa and Caldwell to enter the Boise River at River Mile 20.3. The location of Indian Creek with respect to other Boise Valley drainages is shown in Figure No. 1.

This study was concerned with that portion of Indian Creek near the Nampa and Caldwell urban areas. In this section of the stream the major tributaries are the Wilson Drain, the Moses Drain, the Franklin Road Drain, and the UPRR Drain. Of these tributaries the Wilson Drain is the most significant since it, at times, may quadruple the flow of the stream.

The major land uses in the drainage are associated with urban development and irrigated agriculture. Both of these land uses can have potential impacts on the water quality of Indian Creek.

The geology of the drainage is variable. The headwaters of Indian Creek begin in the western edge of the Idaho batholith which is composed of coarse-textured shallow soils overlying granitic bedrock (U.S. Bureau of Reclamation, 1977). The lower portion of the drainage is characterized by river bottom land, terraces, and low rolling hills with a few foot-hills. In the Nampa/Caldwell area the soil structure is generally described

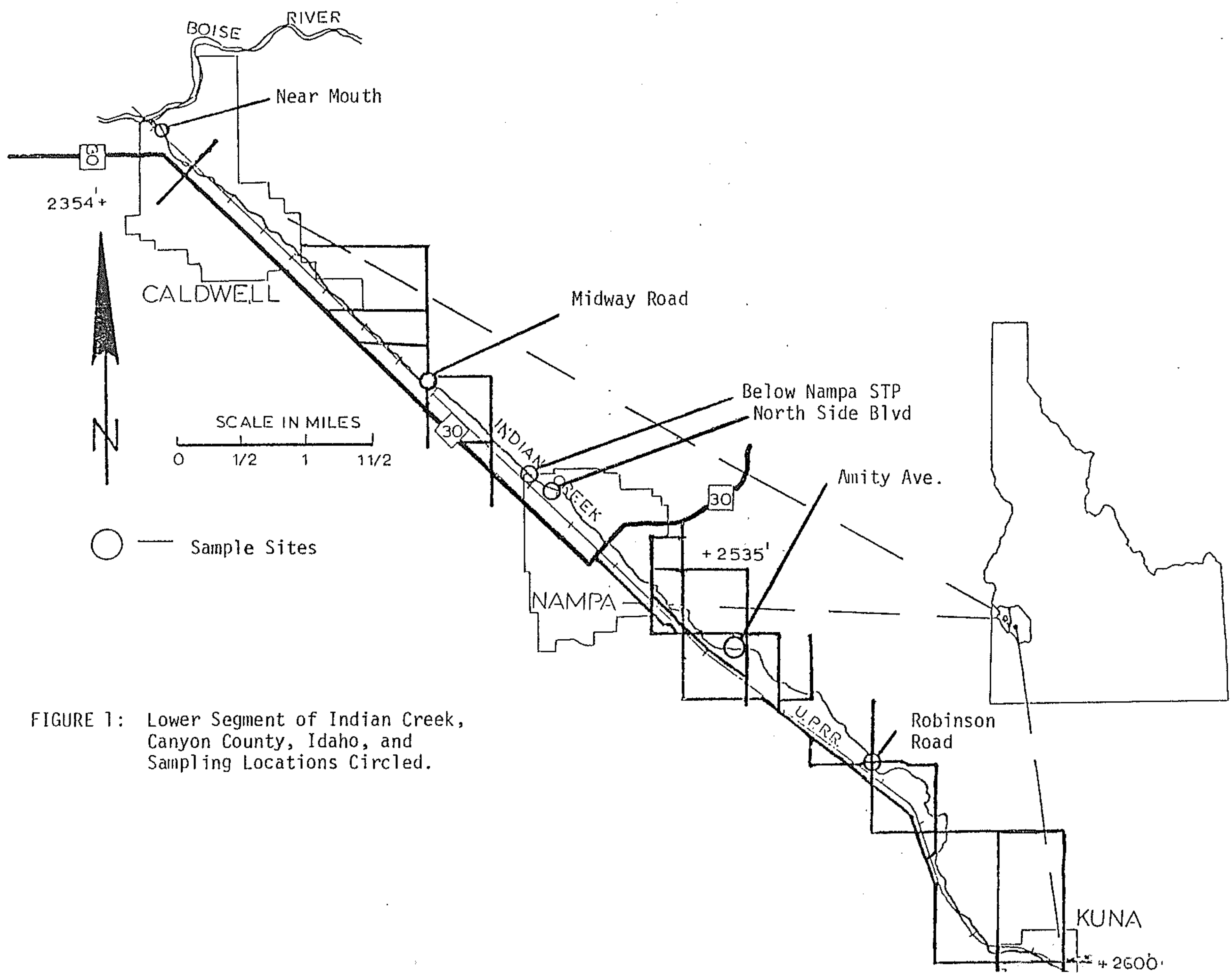


FIGURE 1: Lower Segment of Indian Creek, Canyon County, Idaho, and Sampling Locations Circled.

as moderately deep and deep, well-drained neutral to moderately alkaline, silt loam soils that are nearly level, and formed in alluvium and wind laid silts with 7 to 11 inches of annual precipitation (U.S. Soil Conservation Service, 1973).

Since most of the lower portion of the drainage is under irrigated agriculture, the vegetation is dominated by domestic crops. The major crops represented in the area include sugar beets, potatoes, beans, corn, mint, alfalfa, and pasture grass.

The general climate in the area is characterized by hot, dry summers and moderately cold winters. Dominant air patterns are Pacific maritime air masses moving eastward from which most of the moisture has been removed by the Cascade Mountains and other intervening topographic barriers. The average daily minimum temperatures from November through March are below freezing and average daily maximums during the summer are in excess of 26.7 C (80 F). As mentioned previously, the annual average precipitation is less than 14 inches and generally ranges from 17.8 cm (7 in.) to 27.9 cm (11 in.)(U.S. Bureau of Reclamation, 1977).

Purpose of Study

The purpose of the study on Indian Creek was to assess the effect of the major point sources of water pollution on the water quality of the stream. The study was also conducted to gather additional data to assist the Water Quality Bureau in reviewing the waste load allocation and final design criteria for the then proposed modifications to the City of Nampa Wastewater Treatment Plant (WWTP). Both of these objectives were satisfied by the study.

Past Studies

Several previous studies have been conducted on Indian Creek. One of the earliest of these studies was conducted in 1943. This early study describes the formation of sludge banks along the stream with the existence of an odor nuisance and reduction of dissolved oxygen within the stream. As presently occurs, the severe water quality problems in Indian Creek were due to municipal and industrial discharges (Idaho Department of Health, 1943).

In 1958 and 1959 another water quality study was performed in the Nampa/Caldwell area. This later study was more comprehensive and descriptive. Meat scraps, paunch manure, and blood coloring were noted in the creek along with great amounts of slime growth and sludge. Dissolved oxygen concentrations in Indian Creek were found to be as low as 3.0 mg/l below Keim's in August of 1958 and 2.5 mg/l above Wilson Drain in December of the same year. The bacteriological analysis for this survey indicated bacteria levels as high as 400,000/100 ml which is a gross violation of the present water quality standards. During the era of the 1958 survey, the effect of ammonia toxicity was not considered but the effect of the municipal and industrial dischargers on the biological community was examined. The biological samples collected on Indian Creek in 1958 showed conclusively that the municipal and industrial dischargers reduced the diversity, total number, and desirable species of macroinvertebrates in the stream. The 1958 study depicts Indian Creek at possibly the stream's worst condition.

Intermittent monitoring and other special studies have shown an improvement in Indian Creek water quality from elimination and reduction of various waste sources (Idaho Department of Health and Welfare, 1976). The sludge banks and slime growths have disappeared from the stream but even with these improvements the stream does not meet the water quality standards.

In a recent report by the U.S. Bureau of Reclamation (1977), a firm presentation on the present water quality of Indian Creek is given. The report illustrates vividly the problems with organic material, bacteria, and ammonia which still remain in the drainage. Most of these continuing problems are due to the remaining point source discharges which have not yet been eliminated from the system.

Population and Economic Growth

In 1977 the population of Nampa and Caldwell was 23,584 and 15,643 respectively (Association of Idaho Cities, 1976). By 1990 the populations for these two urban areas are expected to grow to 26,900 for Nampa and 18,400 for Caldwell (U.S. Army Corps of Engineers, 1976). Substantial population growth is expected for both areas.

The major economic basis for the area is centered around agriculture. The industry in the Nampa/Caldwell area is generally directed at food processing, although some other light industry is represented such as mobile home manufacturing. Any economic growth in the area, as viewed at this point in time, will also be based around agriculture, food processing, and light industry (Canyon County Comprehensive Plan, 1975).

STUDY DESIGN

In order to meet the intended objectives, the study was designed to assess the effect of point sources on the water quality of Indian Creek and to obtain additional data for review of the waste load allocation for the City of Nampa. To accomplish this task, monitoring stations were established above and below major point sources and major tributaries, and at key locations between these sampling points. In addition, the major point sources and tributaries were monitored during the intensive portions of the survey. The list of main stem, point source, and tributary stations monitored is given in the final study plan which is presented in Appendix A.

To fully examine the effects of point sources on the water quality of Indian Creek, a list of parameters which would affect the protected uses of Indian Creek was formulated. These parameters were established considering the major point sources of Armour and Company and the City of Nampa Wastewater Treatment Plant. With these sources in mind the parameter list was narrowed to the general areas of organic material, nutrients, bacteria, ammonia toxicity, residual chlorine toxicity, heavy metals, and certain physical characteristics. A full list of the parameters monitored during the survey is given in the study plan in Appendix A.

As the study plan illustrates, the study was divided into two major campaigns. The first of these was a comprehensive survey to establish "cause and effect" relationships in Indian Creek during the winter critical period. This portion of the study was conducted during the week of December 6-10, 1976, and included the monitoring discussed previously with the addition of live box studies for catchable size rainbow trout.

For the second campaign of the study, a select group of main stem Indian Creek stations and point sources were monitored as ambient stations on a monthly basis for the period January through May of 1977. This type of survey enabled the examination of the longevity for water quality problems along Indian Creek during the winter base flow period.

After completion of the May ambient study, the need for a survey during the summer critical period became evident. On August 31, 1977, a comprehensive survey similar to the December 1976 survey without the live box studies was conducted to evaluate summer critical conditions. The results of all the discussed studies are given in this text.

MATERIALS AND METHODS

Field water quality parameters were measured as follows: Temperature and dissolved oxygen (D.O.) with a YSI model 54 dissolved oxygen meter and pH with a Photovolt model 126A pH meter. Dissolved oxygen was also run by the Winkler method to calibrate the D.O. meter. Diel D.O., pH, temperature, and specific conductance was taken with a Martek Mark 5 Digital Water Quality Analyzer.

Water chemistry samples were taken in three 1 liter disposable polyethylene cubitainers. Samples for nutrient analysis were preserved with 2 ml H_2SO_4 and samples for trace metal analysis were preserved with 10 ml redistilled 1:1 HNO_3. One sample bottle was collected with no acid added. All three containers were then placed on ice to cool to 4^oC. Composite samples made on some point source discharges were made with an ISCO sampler. The sampler was set for hourly discrete samples and every other bottle contained H_2SO_4 to preserve nutrients.

Bacteriological samples were collected into 250 ml polyproplene bottles which contained 2 ml of sodium thiosulphate, then placed on ice.

Chemical and bacteriological samples were analyzed by the State Laboratory in accordance with Standards Methods (American Public Health Association, 1975).

Flow measurements were made using a wade rod, Price AA current meter, tape measure and stop watch. Uniform sections of the creek were chosen for measurements. Flows were obtained from the major dischargers to Indian Creek utilizing their flow measuring facilities.

Chlorine demand was obtained by the iodometric back titration method. Chlorine residuals were determined with the use of a La Motte DPD test kit.

Macroinvertebrates were sampled once during the study using rock-filled basket artificial sutstrate samplers as described by Weber (1973). Three rock baskets were placed at each sample station and were anchored with 1/8" steel cable. Uniform habitat selection was attempted but was not always possible. The rock basket samplers were left in Indian Creek approximately eight weeks for maximum colonization. The samplers were retrieved and macroinvertebrates brushed into a bucket then run through a 30 mesh sieve. The samples were sorted into species in the laboratory using magnification. Identifications were made using standard taxonomic references and dissecting and compound microscopes.

Species diversity values were calculated using the formula and methods described by Weber (1973):

$$\overline{d} = \frac{c}{n} (N \log_{10} N - \quad ni \log_{10} ni)$$

$\overline{d}$ = species diversity

where: c = 3.321928

n = total number of individuals

ni = total number of individuals in the i^{th} species

Color photographs of the sample stations were taken with a 35 mm SLR camera.

WASTE SOURCES

Point Sources

In the study area four major point sources are permitted as follows:

Armour and Company	ID-000078-7
Union Pacific Railroad Co.	ID-000025-6
Terminal Ice and Cold Storage Co.	ID-000114-7
City of Nampa	ID-002206-3

Armour and Company operates a meat processing plant southeast of Nampa. The industry has traditionally had an anaerobic/aerobic lagoon system with chlorination which discharges to Indian Creek at approximate River Mile 13.7. However, since their discharge contributed significant amounts of ammonia to Indian Creek, they have been required to upgrade their treatment system. Since the 1977 winter survey on the stream, Armour has added a nitrification system which has reduced tremendously their ammonia discharge. The improvement in the system was needed to meet the following effluent limitations:

	Discharge Limitations			
	Daily Ave. (lbs/day)	Daily Max. (lbs/day)	Daily Ave. (conc.)	Daily Max. (conc.)
Flow (mgd)	--	--	0.416	0.475
Temperautre (^oF)	--	--	70	80
BOD_5	75	90	--	--
Total Suspended Solids	100	120	--	--
Oil and Grease	21	25	6	10
Ammonia (NH_3-N)(mg/l)	15	18	--	--
Fecal Coliform Bacteria/100 ml	--	--	--	200

The above effluent limitations also represent the present waste load allocation for Armour and Company. Their initial permit expired March 31, 1979. The Armour and Company effluent is the second major contributor of organic material and toxic substances to Indian Creek.

The Union Pacific Railroad Company (UPRR) operates an oil separation plant in southeast Nampa which discharges to Indian Creek via a drain at River Mile 12.5. Their discharge has caused a frequent visible oil sheen in their discharge drain and in the stream. A second generation permit for the discharger has the following effluent limitations:

	Discharge Limitations			
	Daily Ave. (lbs/day)	Daily Max. (lbs/day)	Daily Ave. (conc.)	Daily Max. (conc.)
Flow (mgd)	--	--	0.017	0.029
Oil and Grease (mg/l)	1.0	2.4	--	10
BOD_5	3.1	7.3	--	--
Suspended Solids	2.8	4.8	--	--

The UPRR permit expires on June 30, 1982. Although the discharge can cause frequent visible oil problems, it is not a significant contributor of organic material and ammonia when compared to the Armour and Company and the City of Nampa discharges.

The Terminal Ice and Cold Storage Company is involved in the operation of a cold storage warehouse. The discharge is composed of once-through, non-contact cooling water containing no process contaminants except waste heat. The cooling water is discharged to Indian Creek at approximate River Mile 11.0. The NPDES permit for the facility was modified in August of 1977 with the following effluent limitations:

	Discharge Limitations			
	Daily Ave. (lbs/day)	Daily Max. (lbs/day)	Daily Ave. (conc.)	Daily Max. (conc.)
Flow (mgd)	--	--	4.0	--
Temperature (^{o}F)	--	--	--	75

Except for excess heat, the 6.0 cfs of well water from this discharge is an asset to the water quality of Indian Creek.

The City of Nampa at present treats domestic sewage from its resident population and industrial wastewater from sugar beet processing, potato processing, meat processing, and miscellaneous vegetable processing. The Nampa treatment system consists of a high rate trickling filter system with a chlorinated discharge at approximate River Mile 9.1. The City has completed facilities planning for an upgraded treatment plant and has started the final design stage. The waste load allocation and design criteria for the new facility are given later in the text. This waste load allocation has been used as the effluent limitations for Nampa in the recently issued, second generation permit which expires in September 12, 1982. The City of Nampa Wastewater Treatment Plant is the most significant pollution source in the Indian Creek drainage.

Of the protected uses on the lower segment of Indian Creek, the most restrictive is "other fishing and aquatic life". With respect to this use, the Armour and City of Nampa discharges provide the major source of pollutants which threaten or prevent the designated use. The pollutants of extreme concern consist of organic material, ammonia (toxicity), residual chlorine (toxicity), and pathogenic bacteria.

Nonpoint Sources

Although point sources provide the significant pollutants in the Indian Creek drainage, nonpoint sources can also contribute to the water quality problems. Most of the nonpoint source contribution can be related to agricultural runoff, such as irrigation return flows and animal confinement. However, at times, storm runoff from the Nampa and Caldwell urban areas could also be a significant pollution source. The major problems associated with these nonpoint sources include turbidity, sediment, bacteria, and in certain instances nutrients and organic material. The nonpoint source problems on Indian Creek are secondary to the point source problems in preventing the stream from attaining standards to maintain protected uses.

RESULTS AND DISCUSSION

Flow Conditions

During the winter/spring portion of the study, the flows in the study area varied from 6 to 20 cfs at the Robinson Road station to over 240 cfs near the mouth of Indian Creek. The flow during sampling periods at the North Side Boulevard station above the City of Nampa discharge ranged from 29 to 40 cfs. The flow conditions discussed above are typical of normal winter base flow conditions. The 29 cfs flow at North Side Boulevard in December of 1976 was the only instance when the flow in Indian Creek approached the critical one-in-ten year low flow of 22 cfs (U.S. Army Corps of Engineers, August, 1977).

In the August 31, 1977, survey the critical flow was not approached as closely as in the winter survey. During the August survey the flows in Indian Creek ranged from 13.5 cfs at Robinson Road to well over 400 cfs below the inflow of the Riverside Canal near the mouth of Indian Creek. The flow at North Side Boulevard in the August survey was 44.5 cfs or nearly twice the calculated one-in-ten-year low flow of slightly over 22 cfs. The occurrence of cool, rainy weather in late August prevented the precise examination of summer critical conditions.

Temperature

In Figure 2 the overall results of monitoring for temperature are presented for the winter/spring and summer surveys. The temperatures in Indian Creek during the December 1976 to May 1977 survey ranged from 8.0 to 16.0°C fluctuating with season and location. In the August survey, if diel

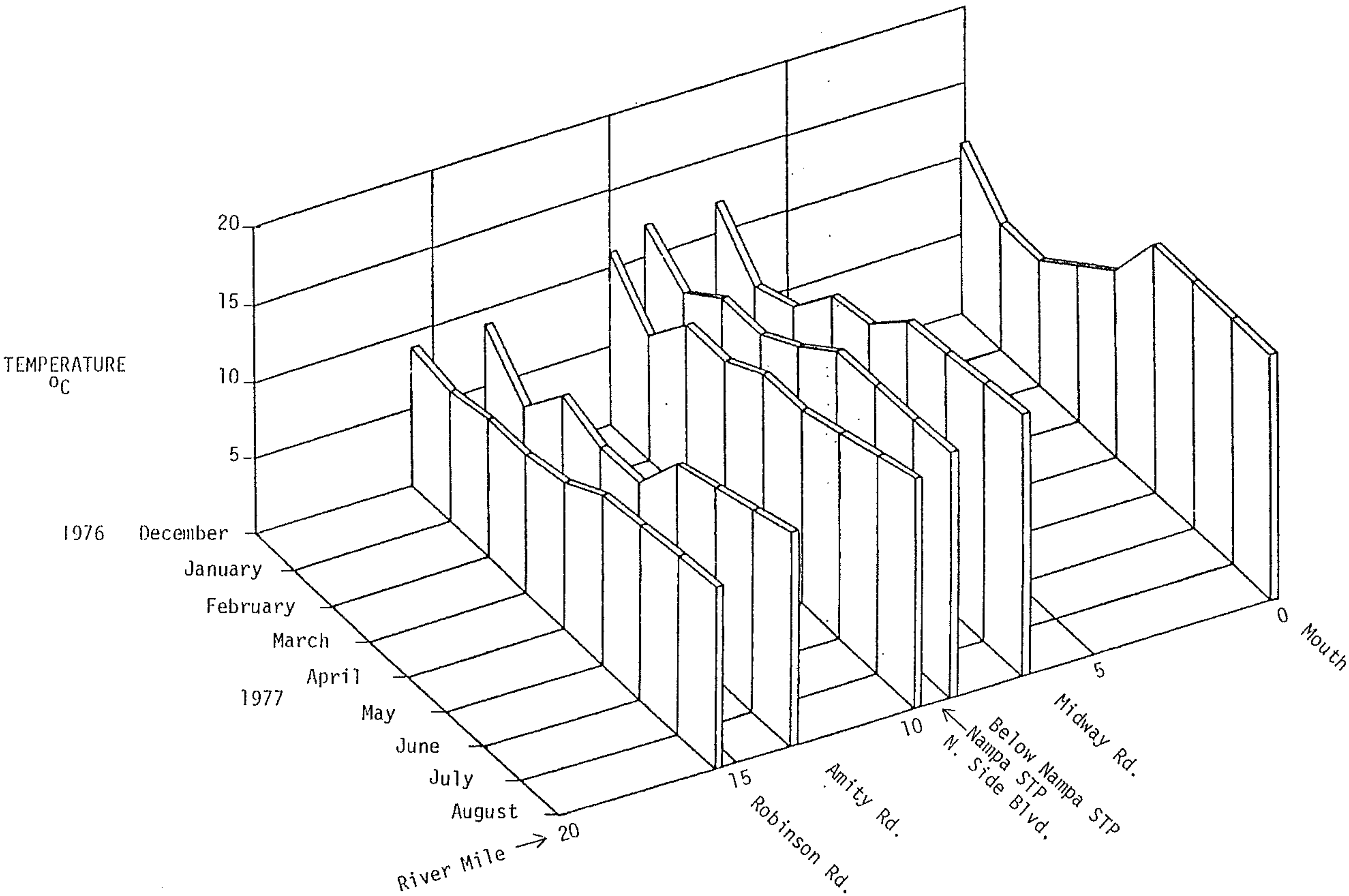


FIGURE 2: Temperature in °C in Indian Creek from December 1976 through August 1977.

effects are included, the instream temperatures ranged from 12.0 to 18.0°C. Neither of the separate surveys revealed instantaneous temperatures which would jeopardize protected uses.

In examining induced instream temperature changes there were repeated violations of the present State standards (Idaho Department of Environmental and Community Services, 1973). During the entire winter/spring survey and the August survey the 0.25°C (0.5°F) single source standard was violated by the City of Nampa discharge. The instream temperatures in the area of the Terminal Ice and Cold Storage discharge also showed temperature increases.

The City of Nampa treatment plant receives a relatively high temperature waste from the Amalgamated Sugar Company during the industry's processing campaign. However, the Amalgamated Sugar Company is phasing into land treatment of their wastewater, and the industry will not be discharging to the future Nampa treatment facility. With this wastewater out of the plant, Nampa will only on occasion violate the temperature standard, but the Water Quality Bureau has determined that the temperature increases will not be harmful to aquatic life. Therefore, the City of Nampa has been granted an administrative variance from the present temperature standard for their future facility.

The Terminal Ice and Cold Storage Company is affected by a somewhat similar situation, and they also have been granted an administrative variance of the present temperature standard.

pH

The pH values experienced during the surveys are illustrated in Figure 3. The values for pH during each of the surveys were all well within the standard range of 6.5 to 9.0 (Idaho Department of Environmental and Community Services,

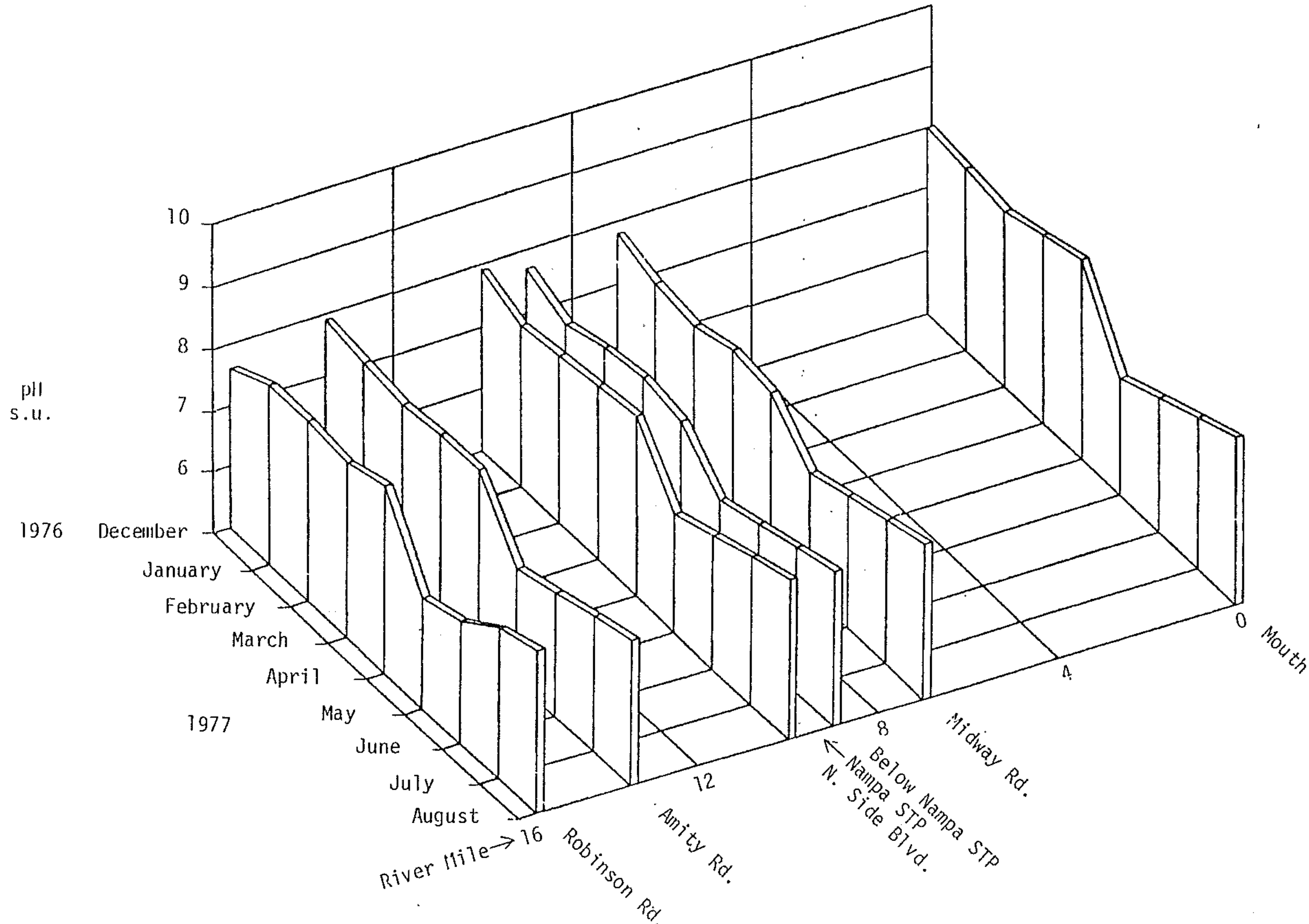


FIGURE 3: pH in standard units in Indian Creek from December 1976 through August 1977.

1973). The only significant induced pH change was around the City of Nampa outfall. This change did not exceed the ± 0.5 unit allowable standard (Idaho Department of Environmental and Community Services, 1973), and was typically a lowering of the instream pH by 0.2 pH units.

Dissolved Oxygen

As is evident in Figure 4, the study recorded a number of significant standard violations of both the 6.0 mg/l and the 90% saturation dissolved oxygen standards (Idaho Department of Environmental and Community Services, 1973). The most severe of these standard violations occurred at the Midway Road station. During the week of December 6-10, 1976, the dissolved oxygen concentration dipped to 1.5 mg/l; in the January survey the parameter plummeted to its lowest measured level of 0.6 mg/l. Although the organic waste load from the Nampa discharge was at its lowest level in August, the dissolved oxygen concentration at Midway Road dropped to 2.4 mg/l at 2252 hours during a diel study. All other stations surveyed upstream from the Nampa discharge during the diel study had dissolved oxygen levels of 5.6 mg/l or higher (Appendix B).

The data shows a number of water quality standard violations for dissolved oxygen both above the Nampa outfall and considerably below that outfall, but these violations are of little consequence when compared to the violations immediately below the Nampa discharge. The main problem with the severe dissolved oxygen violations relates to the protection of aquatic life.

The minimum dissolved oxygen criteria for designated uses that has been proposed by the Division of Environment is as follows:

Salmonid Spawning - the greater of 90% saturation or 6.0 mg/l
Cold Water Biota - 6 mg/l always
Warmwater Biota - 5 mg/l always

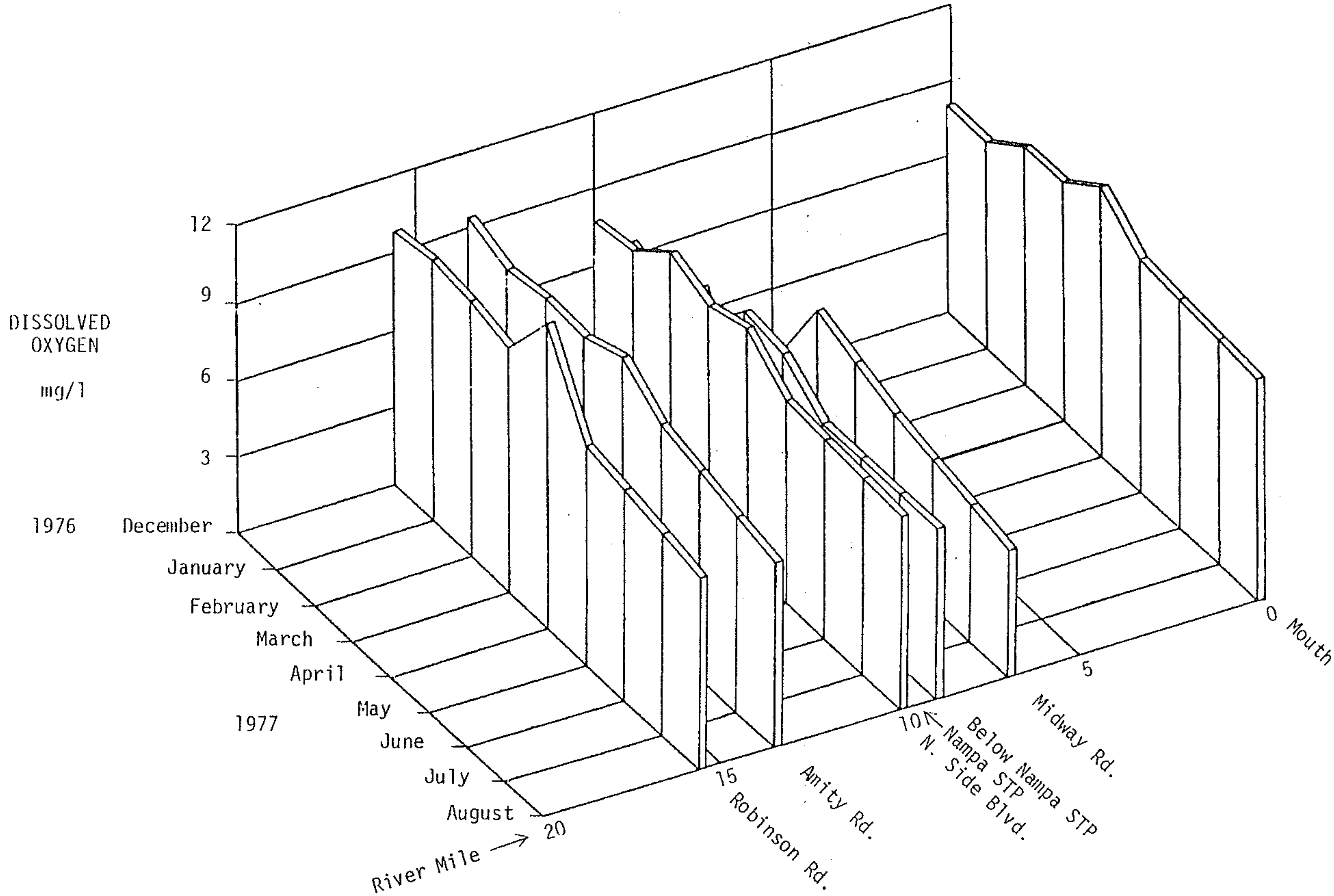


FIGURE 4: Dissolved Oxygen in mg/l in Indian Creek from December 1976 through August 1977.

The segment of Indian Creek above Nampa is protected for all biota uses and the segment below Nampa is only protected for "other fishing and aquatic life" which would include a "put and take" trout fishery and a warmwater fishery. Using the above minimum criteria the upper segment of Indian Creek could support a cold water biota ("put and take" fishery) and a warmwater biota but could not support salmonid spawning on a continuing basis. The stretch of Indian Creek below Wilson Drain is in much the same condition. Therefore, with regard to dissolved oxygen, the City of Nampa effluent is the only entity preventing Indian Creek from providing the protected uses of a resident warmwater fishery and a "put and take" trout fishery. Control of upstream nonpoint sources may be necessary before the 90% saturation standard can be met for salmonid (trout) spawning on the upper segment of the stream.

Organic Loading

The instream chemical oxygen demands (COD) along Indian Creek during the winter/spring and summer surveys are given in Appendix B. The instream COD concentration increased slightly below Armour during the winter/spring survey. In August after the addition of Armour's nitrification system, the concentration of COD decreased in Indian Creek below the Armour outfall.

The COD concentration during the winter/spring survey increased tremendously below the City of Nampa outfall with considerable fluctuation. These highly sporadic increases are due to the fluctuating industrial waste loads that reach the Nampa treatment facility. The Amalgamated Sugar Company is especially troublesome in sending heavy slug loads which upset treatment efficiency.

In the August 1977 survey when Amalgamated was not discharging to the facility, the instream COD concentration had improved considerably. However, the improvement was not sufficient to prevent dissolved oxygen problems in Indian Creek below the Nampa outfall as previously evident in Figure 4.

The results of monitoring for chemical oxygen demand were discussed first due to the inherent accuracy in laboratory procedures over biochemical oxygen demand. However, since a portion of the chemical oxygen demand is not biodegradable, the biochemical oxygen demand cannot be ignored.

In Table No. 1 the biochemical oxygen demand (5-day, 20°C or BOD_5) loadings at several different locations for the December 1976 and August 1977 surveys are given. The table also compares the two major point sources to the station above Wilson Drain if that station represented background BOD_5 levels (Robinson Road levels) for the drainage. The table shows that the City of Nampa is the major source of BOD5 in the drainage.

In Table No. 2 the December 1976 and August 1977 instream and effluent conditions are compared to the present waste load allocation for Nampa. The comparison in Table No. 2 is important in the Water Quality Bureau's review of Nampa's waste load allocation since it illustrates the major oxygen demanding parameters and their effect on instream dissolved oxygen concentrations. With the effluent dissolved oxygen concentration and ammonia loading aside, the BOD5 loading of the Nampa discharge during each survey was in the same order of magnitude or lower than the present daily maximum limitation of their waste load allocation. The

December 1976 flows were only within 7 cfs of critical winter flow conditions, and the August 1977 survey flow was about twice the recognized critical flow for that season. Also, the instream temperatures during the August survey did not approach the probable high temperatures that are likely for the summer critical period. However, with the comparable BOD_5 loadings and noncritical flows, the dissolved oxygen concentration still dipped below both the present standard for the parameter and a level suggested to protect aesthetics (approximately 4.0 mg/l). Although the effluent dissolved oxygen concentration and ammonia loading would contribute to this phenomenon, the present BOD_5 limitation on the Nampa discharge should probably be lowered to insure maintenance of the dissolved oxygen standard and protected uses.

At the present time the City of Nampa has planned to provide nitrification to meet effluent limitations for ammonia based toxicity. Inadvertently the nitrification process will provide additional BOD_5 removal. For this reason the organic loading of the Nampa discharge will be considerably lower than what their present waste load allocation would require and there should be little concern for revising the BOD_5 limitations at this point in time. However, if the ammonia limitations for toxicity are raised or if aquatic life uses are dropped from lower Indian Creek, the BOD_5 and ammonia limitations should be reexamined in order to insure that the present unaesthetic conditions below the Nampa outfall are eliminated. In other words, even without the protection of aquatic life uses, water quality related effluent limits for BOD_5 and ammonia may be needed to improve aesthetics.

TABLE 1

COMPARISON OF BOD_5 LOADINGS ALONG INDIAN CREEK FOR DECEMBER 7, 1976, AND AUGUST 31, 1977

Date	Total BOD_5 Loading at Robinson Road (lb/day)	Total BOD_5 Loading of Armour Effluent (lb/day)	Total BOD_5 Loading at Northside Blvd. (lb/day)	Total BOD_5 Loading of Nampa WWTP (lb/day)	Estimated Total* BOD_5 Loading of Background at Statio above Wilson Drain (lb/day)
12/07/76	60	49	813	5,655	590
08/31/77	33	142	60	3,009	140

PERCENTAGE CONTRIBUTION OF MAJOR BOD_5 SOURCES FOR INDIAN CREEK ABOVE WILSON DRAIN

	December 7, 1976	August 31, 1977
Station above Wilson Drain at Background Levels	9%	4%
Armour and Company	1%	4%
Nampa WWTP	90%	92%
TOTAL	100%	100%

*Robinson Road Concentrations were used for this comparison.

TABLE 2

COMPARISON OF PRESENT NAMPA WASTE LOAD ALLOCATION TO DECEMBER 7, 1976, AND AUGUST 31, 1977, CONDITIONS

Parameter	Present Nampa Waste Load Allocation	Effluent Conditions Dec. 7, 1976	Effluent Conditions Aug. 3, 1977
BOD_5	7,900* lb/day	5,655	3,009
Dissolved Oxygen	7.6** mg/l	3.5 mg/l	4.4 mg/l
Total Ammonia as N	163 lb/day	1,274	772
Critical Dissolved Oxygen in Indian Creek	85% C_s*** for both summer & winter conditions	3.4 mg/l or 33% C_s	2.4 mg/l or 26% C_s

*Daily Maximum
**90% Saturation at 20°C
***C_s is Saturation Concentration

Ammonia

The presence of ammonia toxicity in Indian Creek is one of the worst water quality problems presently affecting the drainage. Past studies have shown that the component of the total ammonia which affects the toxicity most is the un-ionized form (EPA, 1976). The un-ionized fraction increases with increasing pH and temperature. Therefore, to prevent toxic conditions at higher temperatures and pH, the instream level of total ammonia must be less than at a lower pH and temperature.

In Figure 5 the total ammonia concentration as nitrogen is illustrated for the winter through summer period. The monitored ammonia concentrations are compared to the chronic toxicity levels recognized (Willingham, 1976) for both the waste load allocation basis and general conditions during the survey.

During the winter through spring surveys the ammonia concentration below the mixing zone of the Nampa outfall varied from 3.0 to 11.3 mg/l. For the same time period the ammonia concentration at Midway Road ranged from 2.44 to 7.05 mg/l. Both of these stations were considerably greater than the recommended toxic concentration for the entire period. Evidence of improvement by the dilution of Wilson Drain was recorded by the station near the mouth which ranged from 0.19 to 1.82 mg/l. The existence of toxic conditions below Armour was verified by the station at Amity Road which showed ammonia concentrations ranging from 1.72 to 3.42 mg/l.

In the August 1977 survey conditions for ammonia toxicity had improved. The ammonia concentration below the Nampa outfall dropped to 1.22 mg/l and further dropped to 0.8 mg/l at Midway Road. The reduced waste loads of the August period and high summer infiltration flows to the Nampa treat-

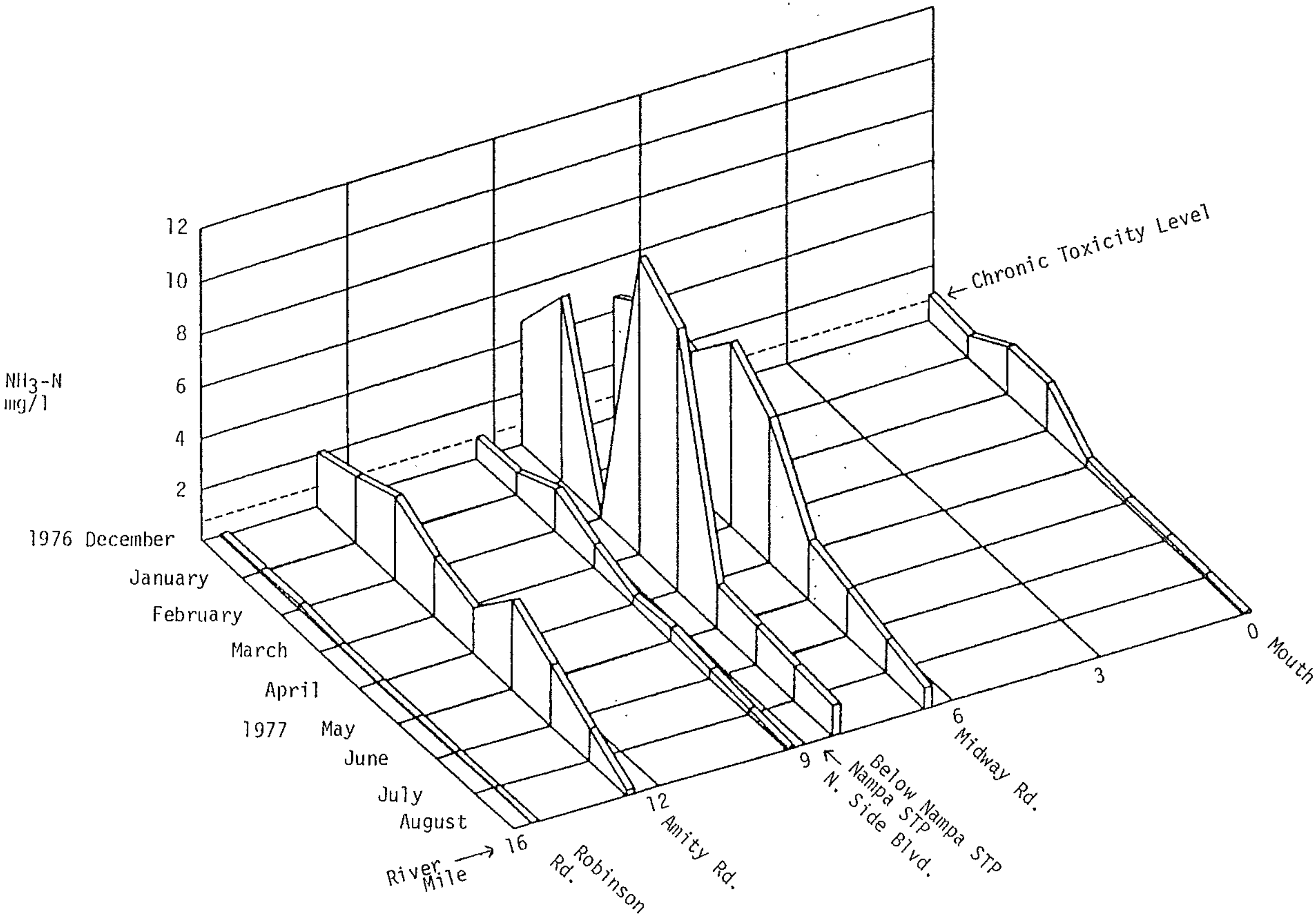


FIGURE 5: Total ammonia in mg/l in Indian Creek from December 1976 through August 1977.

ment facility had reduced effluent ammonia concentrations considerably. The flow above the outfall, being about twice the critical flow, diluted the effluent even more and the result was significantly reduced ammonia concentrations downstream. The improvement below Armour is more permanent since the reduction was mainly due to the addition of nitrification to the Armour treatment process. At Amity Avenue the ammonia concentration dropped from an average above 2.0 mg/l during the winter to slightly over 0.2 mg/l in August.

The results of monitoring for ammonia reveal two facts. First, during the entire winter season the chronic toxicity for ammonia is exceeded in a large segment of Indian Creek below the Nampa outfall. Secondly, by analyzing Figure 5, it is evident that the addition of nitrification by Armour has eliminated the toxic conditions below their outfall. The improvement below Armour should be sufficient to support the prescribed fishery uses above the City of Nampa outfall.

In Appendix B the results of monitoring for nitrate during the winter, spring, and summer surveys are illustrated. The nitrite form of nitrogen is an intermediary in the nitrification process of ammonia to nitrate. As the data indicates, the concentration of nitrate decreases slightly below Armour and significantly below the Nampa outfall. Moderate concentrations of nitrite can also be toxic to aquatic life (EPA, 1976).

Major Nutrients

The occurrence of excessive nutrients which can stimulate nuisance algal growth has been experienced in many places in Idaho. The results of nutrient monitoring in Indian Creek for total phosphorus, ortho-phosphorus, and nitrate nitrogen are presented in Appendix B.

For total phosphorus instream concentrations ranged from 0.17 mg/l at Robinson Road to almost 2.0 mg/l below the Nampa outfall in December of 1976. In the August 1977 survey the total phosphorus concentrations varied from 0.19 mg/l at Robinson Road to 1.32 mg/l below the Nampa outfall. All stations sampled during both surveys were considerably above the recommended algal bloom potential of 0.05 mg/l.

The ortho-phosphorus concentrations followed much the same trend as total phosphorus. In December the instream values ranged from almost 0.1 mg/l at Robinson Road to well over 1.1 mg/l below the Nampa outfall. For August the results were similar with the ortho-phosphorus concentrations varying from 0.13 mg/l at Robinson Road to slightly greater than 1.0 mg/l below the Nampa outfall. All of the stations sampled were greatly above the recommended algal bloom potential of 0.01 mg/l for ortho-phosphorus (Sawyer, 1947). Since much of the ortho-phosphorus is available for direct algal uptake, the instream concentrations are of greater consequence.

The nitrate levels in Indian Creek show somewhat the reverse of phosphorus levels. The nitrate concentration at Robinson Road starts high with a range of 3.0 to 4.1 mg/l during the winter/spring survey and 1.7 mg/l in the August survey. This high is probably due to the fact that much of the source of water for Indian Creek above Robinson Road is groundwater inflow. In the winter/spring survey the nitrate gradually declines downstream until the Nampa discharge where there is generally a sharp drop. The sharp drop occurs because most of the Nampa effluent nitrogen is in the form of ammonia or organic nitrogen. The low nitrate level of the effluent essentially dilutes the nitrate level of Indian Creek. From below the Nampa outfall downstream the nitrate concentration appears to generally decline except in certain instances when the ammonia levels are sufficiently high enough that nitrification exceeds dilution between the Nampa outfall and Midway Road. After the confluence of Wilson Drain, nitrate levels increase due to the effect of this drain on Indian Creek.

The August 1977 survey for nitrate indicated a minor change over the winter/spring survey. The nitrate declined downstream from Robinson Road, but increased significantly at Amity Avenue. The reason for the difference over winter conditions was Armour's new nitrification process which converts ammonia to nitrate.

With one exception the nitrate levels during all the surveys for all the stations were over the recommended algal bloom potential of 0.3 mg/l (Sawyer, 1947). With both nitrogen and phosphorus levels over algal bloom criteria in the entire study area, the growth of nuisant algal communities could develop in Indian Creek.

Residual Chlorine

During the survey period total residual chlorine was monitored at four instream locations: Armour Effluent, Amity Road, Nampa Sewage Treatment Plant (STP) Effluent, and below the Nampa STP. Total residual chlorine was measured as mg/l by a DPD color comparator. The following illustrates the survey results:

	Armour Effluent	Amity Road	Nampa STP Effluent	Below Nampa STP
1/77	0	0	0	0
2/77	0.9	--	0.7	--
3/77	2.4	--	1.7	--
4/77	3.0	0	1.0	0.2
5/77	0	--	1.5	--
8/77	--*	0	2.2	0.3

* No Data.

The data indicates that the effluents from the Armour plant and the Nampa STP are contributing residual chlorine to Indian Creek.

Recent compilation of research on chlorine toxicity has set an instream criteria of 2.0 ug/l for salmonid fish and 10.0 ug/l for other freshwater and marine organisms. Some very recent research has found a number of warmwater fish as susceptible as salmonids and, therefore, the criteria will be changed to 2.0 ug/l for all species (Brungs, Personal Communication).

The main factor affecting the residual chlorine limit for Nampa is the expected immediate chlorine demand of Indian Creek. A number of tests conducted on Indian Creek have indicated immediate chlorine demands ranging from 0.1 to 1.1 mg/l. The two variant chlorine sources upstream were the probable causes for the broad range. Future control of these sources should help narrow the fluctuations of the instream demand. Of the recorded chlorine demands several values of 0.7 mg/l have been reported and conditions during these particular tests prompt heavier reliance on this value. However, the immediate chlorine demand depends a great amount on the quantities of reactive chemicals and organics in the water. These could fluctuate over a wide range especially seasonally.

Heavy Metals

The following heavy metals were monitored on two sampling dates, December 1976 and August 1977: arsenic, cadmium, copper, lead, zinc, and mercury (Appendix B). Arsenic, copper, lead and zinc were always found to be at levels below acceptable criteria, and would therefore present no problem. The defined criteria levels (U.S. Environmental Protection Agency, 1976) for cadmium and mercury are below the detection capabilities of the current equipment of the Bureau of Laboratories.

Turbidity

Turbidity is a measure of the amount of material being carried in the stream. The water quality standards of the State of Idaho indicate that turbidity other than from natural origin should not exceed 5 Jackson Turbidity Units (JTU=NTU)(Idaho Department of Environmental and Community Services, 1973).

The turbidity readings were high at the Amity Road station (23.0 NTU) and at all the remaining downstream stations on two occasions, January and May samplings (Figure 6). These levels are just under the 25 NTU maximum level for the protection of aesthetics and therefore present no problem. The lowest turbidity readings occurred during the March sampling period at the Robinson Road station (0.7 NTU).

Total Non-filterable Residue

The total non-filterable residue (suspended solids) is that fraction of the total residue (solids) which exist in a non-liquid state and are dispersed in the water column to give a heterogeneous mixture. The amounts of solids in a stream of this type may be one of the major limiting factors for aquatic life.

The suspended solids were the greatest at the Amity Road station during January (78 mg/l) and on this sampling date the remaining downstream station possessed readings 40 mg/l (Figure 7). Levels above 80 mg/l are considered to impair fisheries uses. Robinson Road station and North Side Boulevard both had the lowest readings on the April sampling date. Therefore, suspended solids were approaching critical levels in Indian Creek during the study period.

Live Box Studies

On December 6, 1976, ten hatchery trout were placed in wire boxes (live boxes) at seven locations along Indian Creek in order to assess the existence of toxic conditions. The experiment was duplicated December 7, 1976, since all fish at the seven stations had died the previous day.

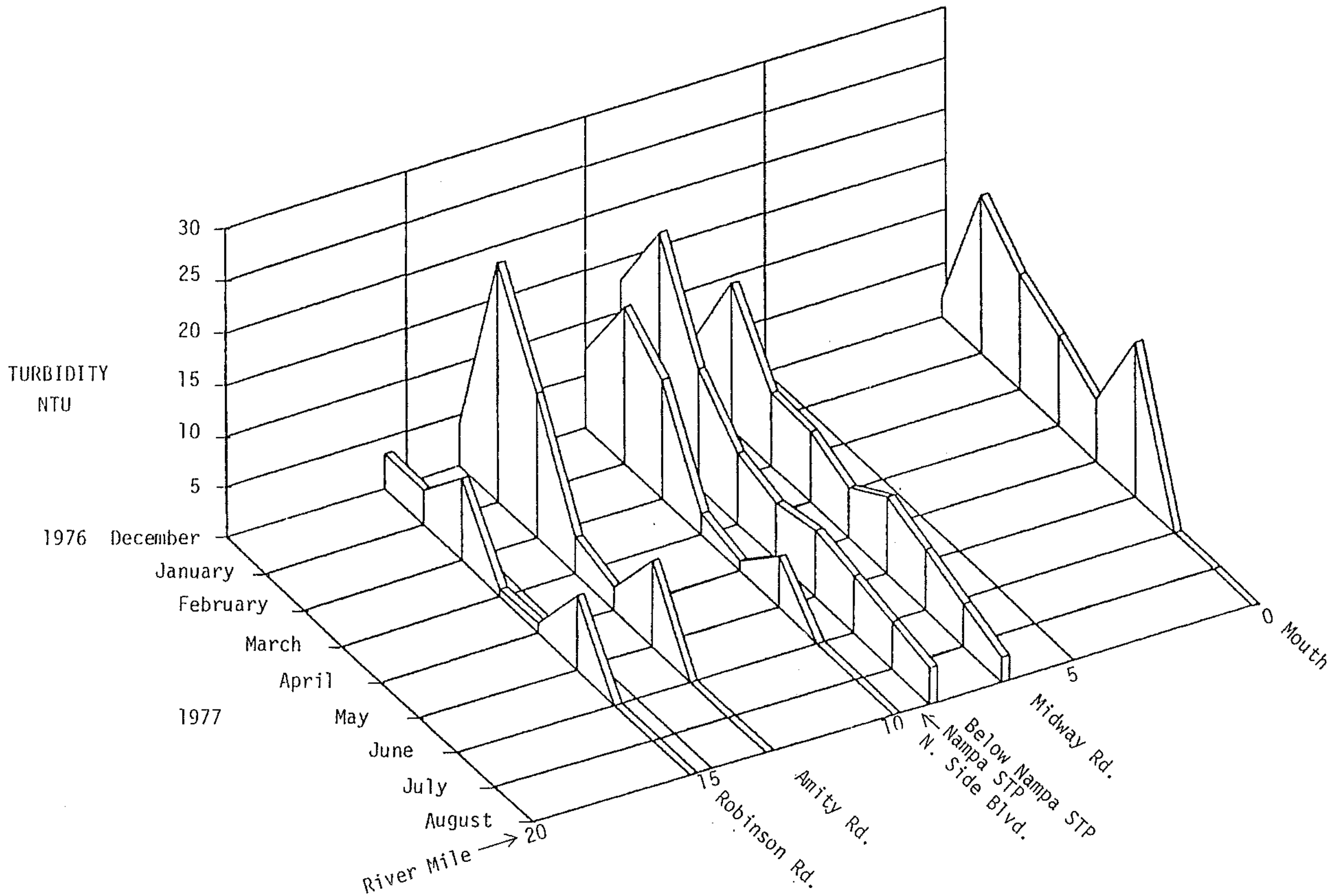


FIGURE 6: Turbidity in NTU units in Indian Creek from December 1976 through August 1977.

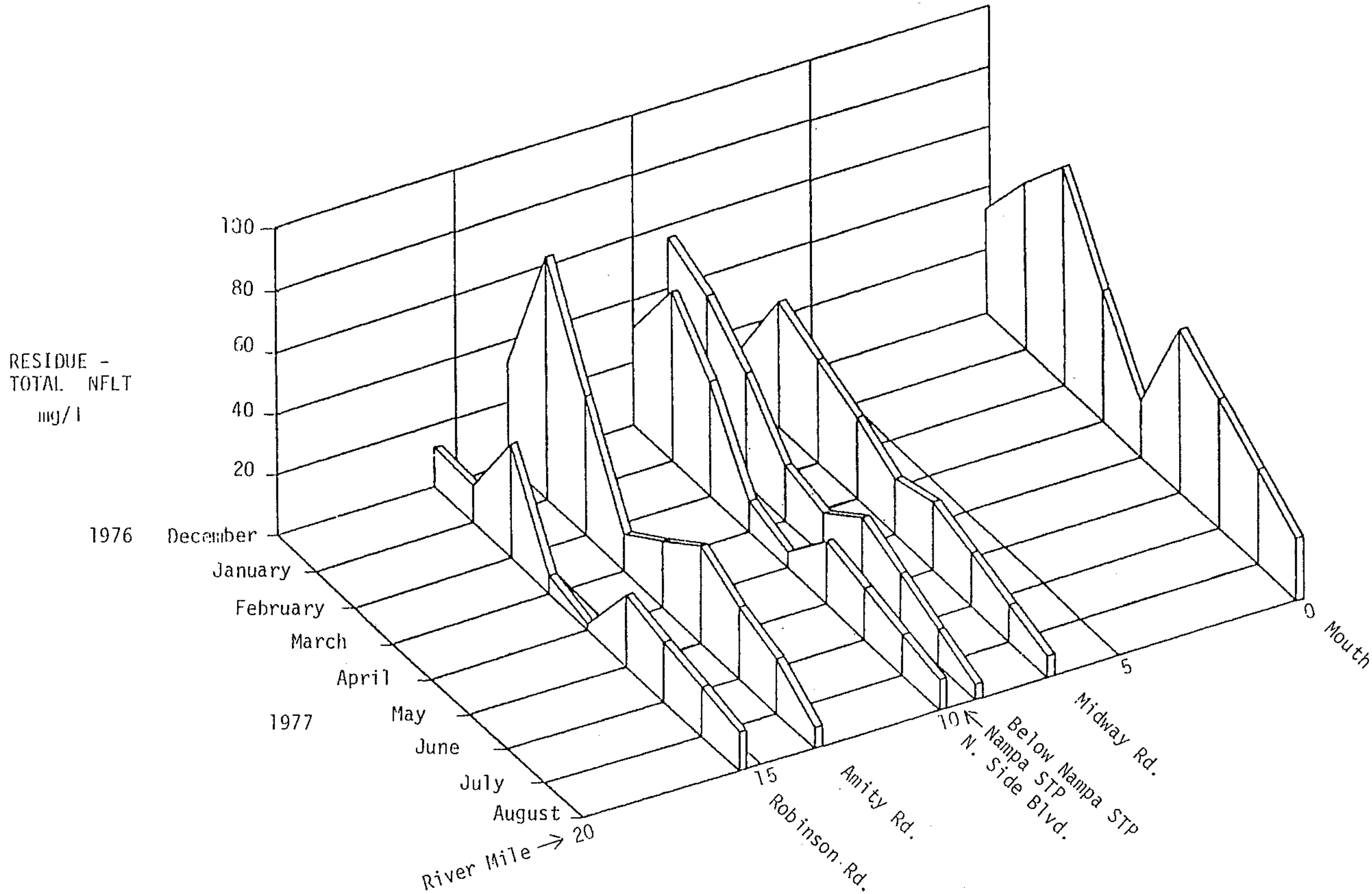


FIGURE 7: Total non-filterable residue in mg/l in Indian Creek from December 1976 through August 1977.

The fish were obtained at the Idaho Department of Fish and Game's Eagle Fish Hatchery the morning of their deposition in Indian Creek. All fish were placed in the appropriate locations as soon as possible. The fish were examined every six hours and field parameters were measured.

All fish (ten per wire cage) survived at the uppermost station, Robinson Road, seven miles above Nampa's discharge. The station at Amity Avenue below Armour was vandalized once, and restocked with only one mortality during the remainder of the experiment. At North Side Boulevard immediately above the city's discharge three fish died after the second day, two more died the third day, and one more died the fourth day. All of the fish placed immediately below Nampa's discharge died within five hours the first day. Eight of the ten fish replaced at this station on the second day died within four hours and the two remaining fish were dead the following morning. Two and one-half miles downstream at Midway Road similar results were observed. All fish were alive and healthy at the station above Wilson Drain for the entire experiment. Eight fish remained alive for two days at the South Fifth Street bridge in Caldwell until the live box was vandalized at the end of the second day. Electrofishing revealed an abundance of non-game fish above Nampa and a complete absence of fish below Nampa to the mouth.

Biological Community

The use of benthic macroinvertebrates as indicators of stream status is important because they indicate longer term conditions as compared with chemical analysis which indicates the condition at the time the sample is taken.

Aquatic macroinvertebrates "are animals that are large enough to be seen by the unaided eye and can be retained by a U.S. Standard No. 30 sieve

(28 meshes per inch, 0.595 mm openings) and live at least part of their life cycles within or upon available substrates in a body of water or water transport system" (Weber, 1973).

Rock basket samplers were placed at the six stations shown in Figure 8. These samplers were also placed at the station on Indian Creek just above the confluence of Wilson Drain; however, the samplers were lost due to vandalism.

The macroinvertebrate species diversity of Indian Creek for January 1977 is shown in Figure 9. According to these indices the only "unpolluted" station was the most upstream station near Robinson Road Bridge. Even this station is not of the highest quality as evidenced by the complete absence of stoneflies (Insecta: Plecoptera). Various agricultural wastes are received by Indian Creek above this station.

The species diversity drops slightly below the discharge of Armour and Company, Nampa, then remains unchanged until the station below the Nampa Sewage Treatment Plant. At this station the greatest change (drop) in species diversity occurred. This reduction in the species diversity value reflects the low number of taxa present and the relatively high total number of organisms present (See Figure 8).

One of the species present was that of the filter fly, *Psychoda* sp. Filter flies are a very common inhabitant of trickling filters and are present at the Nampa Sewage Treatment Plant. The Psychods present below the STP in Indian Creek probably arrived via the plant's effluent and actually elevate the species diversity of the station somewhat. According to Weber (1973) this pattern is characteristic of grossly stressed situations such as the discharge of organic nutrients (high oxygen demand). The discharge of

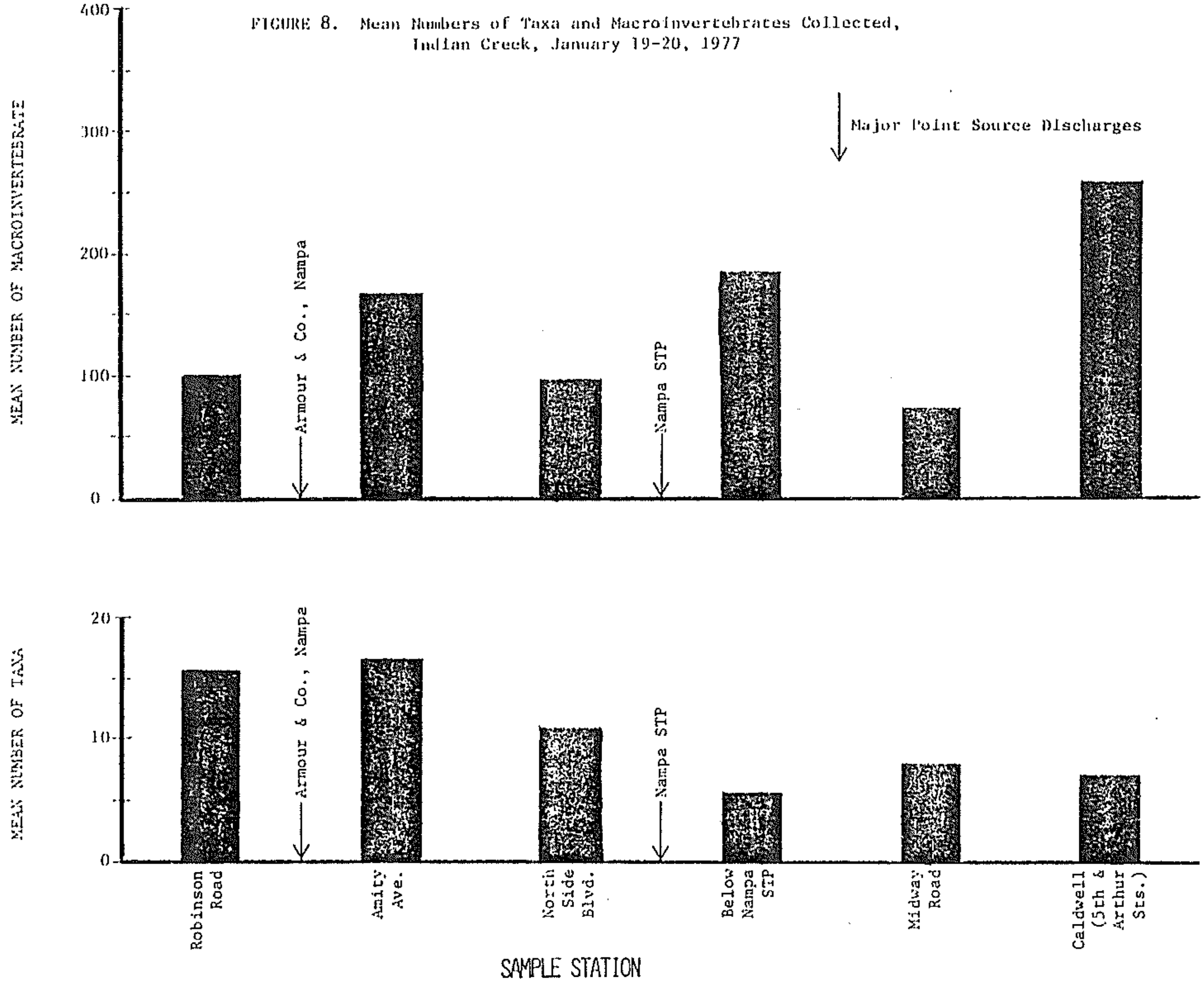
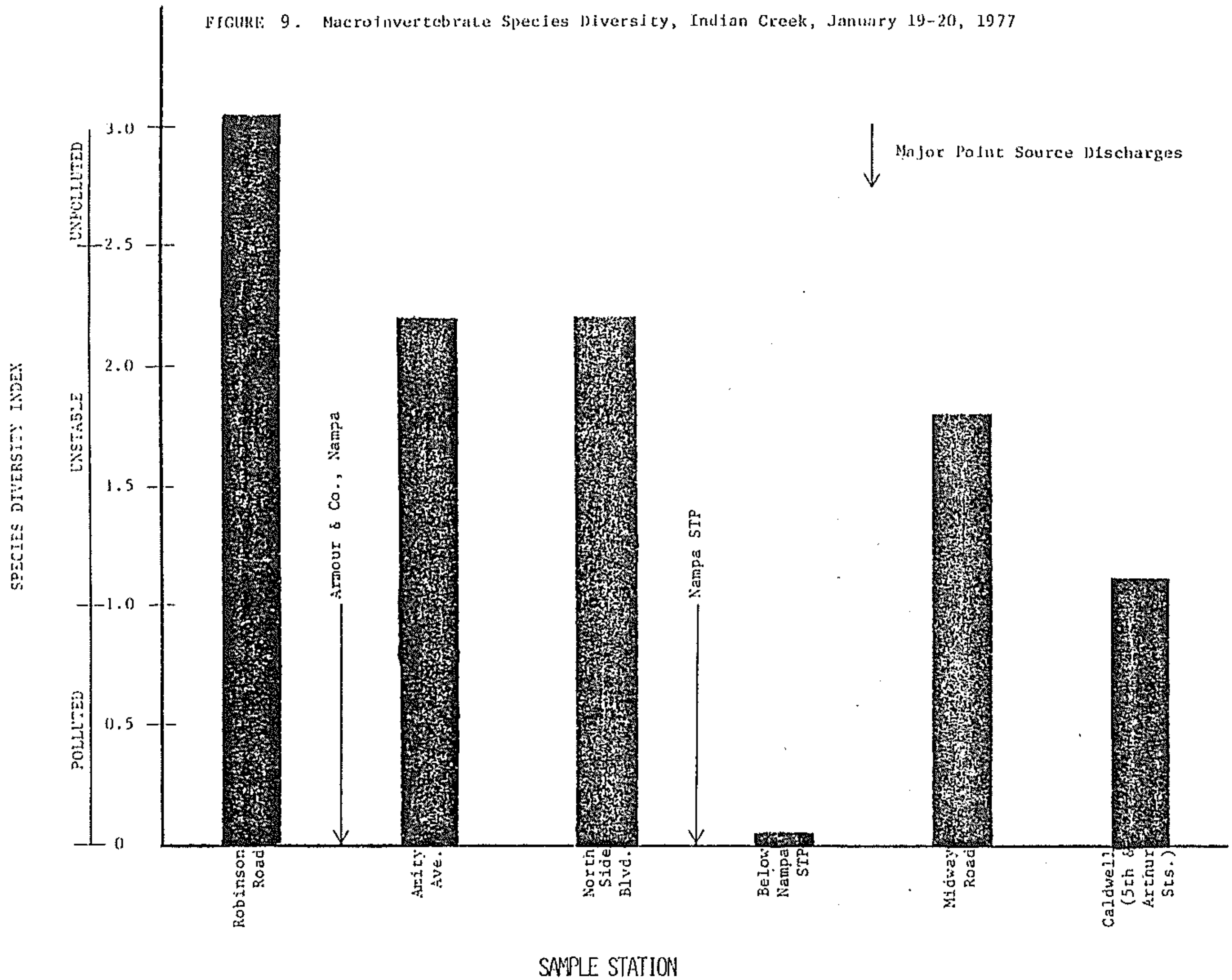


FIGURE 8. Mean Numbers of Taxa and Macroinvertebrates Collected, Indian Creek, January 19-20, 1977

FIGURE 9. Macroinvertebrate Species Diversity, Indian Creek, January 19-20, 1977



inorganic nutrients can also elicit a similar response. The addition of toxic substances (such as ammonia and chlorine) can also reduce the number of species that can inhabit a particular stream segment.

The species diversity partially but never fully recovers downstream before it enters the Boise River in Caldwell.

<u>Bacteria</u>

In Figures 10 and 11 fecal coliform and fecal streptococcus bacteria counts for the study period are illustrated. The graphs illustrate that extreme high and low counts were found at the same station. This station was below the Nampa STP, and the high and low counts for total coliform organisms were 750,000/100 ml and 55/100 ml, respectively. This range in count is due to differences of effluent quality ranging from upset conditions to periods of over chlorination by Nampa. The high count was reported on January 12, 1977, when the Nampa facility was under upset conditions due to industrial waste inflows. The present chlorination system at the Nampa STP cannot handle hydraulic and organic overloads and therefore at times suffers ineffective treatment. Under normal waste loads, the effluent chlorine concentration can exceed 2.0 mg/l and not only kill the effluent bacteria but instream bacteria and aquatic life in Indian Creek as well. The over chlorination has probably been responsible for reduced total coliform counts below the Nampa outfall. As indicated by Figure 10, the fecal coliform numbers followed a similar trend for the winter/spring survey.

Fecal streptococci are present in the feces of human and warm blooded animals. The ratio of enterococci (fecal coliforms) to other streptococci (fecal streptococcus) occurring in feces is known to differ among vertebrate species. Human feces contain a greater number of coliforms, causing the

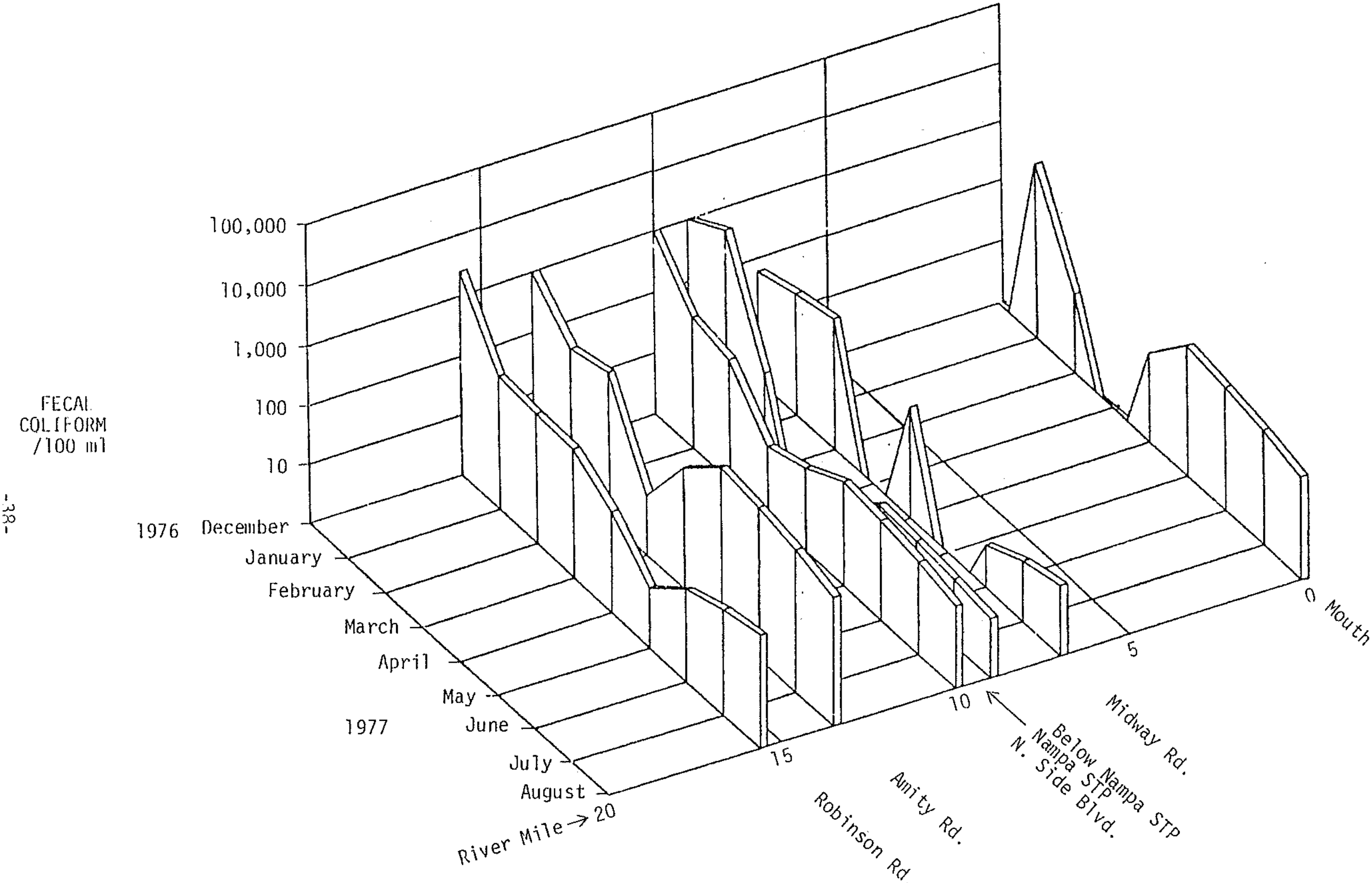


FIGURE 10: Number of Fecal Coliforms per 100 ml in Indian Creek from December 1976 through August 1977.

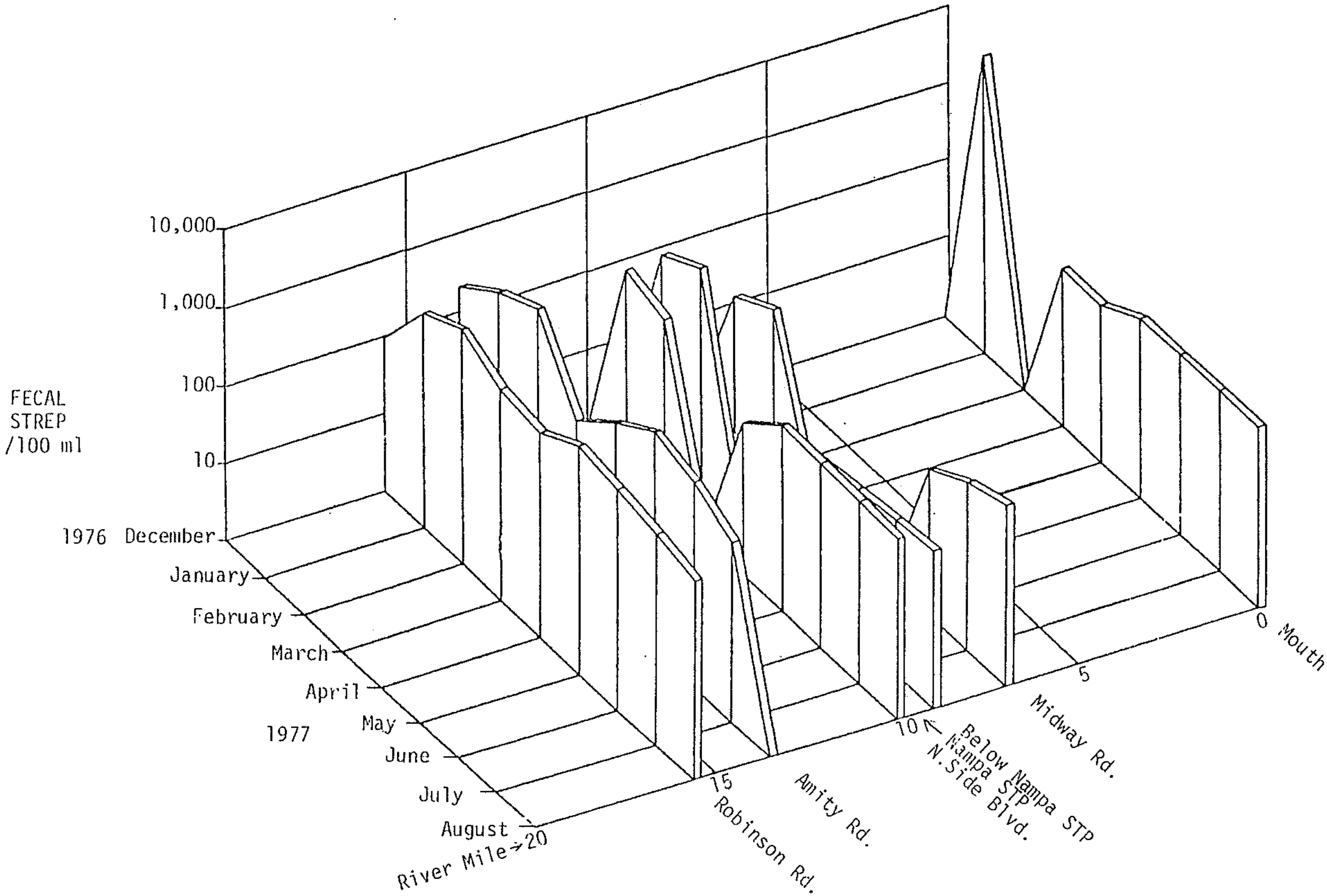


FIGURE 11: Number of Fecal Streptococcus per 100 ml in Indian Creek from December 1976 through August 1977.

fecal coliform-fecal streptococcus ratio to exceed 4.0 (Geldreich, et. al., 1969). Claussen (1977) noted that fecal contamination from animal sources are characterized by a ratio which does not exceed 0.7. All stations on Indian Creek possessed individual averages greater than 1.9 with an overall average for the entire stream at 2.8. This indicates that there is a strong possibility of bacterial contamination due to a human source.

During February, water samples were taken at five locations along Indian Creek and laboratory analyses were performed for the detection of pathogenic bacteria. Salmonella tennessee was the only pathogen detected. It was found at two locations, Karcher Road site and at the Nampa sewage treatment plant outfall.

CONCLUSIONS

Indian Creek meets instream Idaho water quality standards for pH, and for temperature most of the time with the Nampa STP causing occasional elevated temperatures. The Nampa STP has been granted a variance for temperature since its temperature increases will not inhibit the designated uses.

Dissolved oxygen levels often violate instream standards below the Nampa STP. The Nampa STP is also the sole contributor to elevated ammonia levels in Indian Creek since Armour installed advanced treatment.

Nutrients such as nitrate-nitrogen, ortho-phosphorus and total phosphorus were present at all stations above acceptable levels throughout the survey. Therefore, the nuisance growth of algae and macrophytes in Indian Creek is possible. Nonpoint sources appear to be contributing nutrients throughout the Indian Creek system, but the Nampa STP is the major point source contributor.

Total residual chlorine levels were found to exceed the recommended criteria below the Armour discharge and the Nampa STP. These two point sources in addition to the nonpoint sources within the area also contribute to the elevated turbidity and total non-filterable residue levels found during the survey period.

The biological community throughout the Indian Creek study area is not of the highest quality. Upstream from the above mentioned point sources species diversity levels are not extremely high indicating some degradation from nonpoint sources. Species diversity below the Armour discharge drops slightly and remains unchanged until below the Nampa STP where there is a severe reduction.

Fecal coliform bacteria exceeded standards for secondary contact recreation at most sampling sites during the survey period. An analysis of the bacterial ratios indicates that there is a strong possibility of bacterial contamination due to a human source. This appeared to be due to upset conditions at the Nampa STP and possibly some failing individual on-site sewage systems.

Indian Creek should be classified as water quality limiting due to violations of Idaho's instream water quality standards and criteria for: bacteria, nutrient, ammonia, dissolved oxygen, and total residual chlorine but protected uses can be maintained if the Nampa discharge is improved.

RECOMMENDATIONS

Indian Creek is classified as water quality limiting because of bacterial, nutrient, ammonia, dissolved oxygen and total residual chlorine violations of Idaho's instream water quality standards and criteria. At the time of the survey two principal point sources and some nonpoint source originated activities appear to be responsible for the condition of Indian Creek.

From Idaho Fish and Game Department recommendations and field observations during the Indian Creek study, the segment below Sugar Avenue or the Nampa treatment plant can physically support and should be protected for the following uses:

- Agricultural Water Supply
- Cold Water Biota
- Warmwater Biota
- Primary Contact Recreation
- Secondary Contact Recreation

The control of point and nonpoint sources within the drainage should be directed at establishing or maintaining these uses.

Since the study period one of the point sources, Armour and Company, has improved their treatment facility and their discharge may now only be affecting the streams water quality with residual chlorine. If this is monitored regularly by Armour and Company, it should not cause problems.

The other point source, Nampa's Sewage Treatment Plant, is the principal contributor of the above mentioned pollutants to Indian Creek. Construction of the new sewage treatment facility in Nampa should resolve a large portion of Indian Creek's water pollution problems.

Nonpoint source activities such as confined livestock feeding, urban runoff, irrigation return flows and individual sewage disposal systems should be individually identified and encouraged to implement Best Management Practices as they are identified in Idaho's 208 Clean Water Program.

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APPENDIX A

FINAL DRAFT OF STUDY PLAN

INDIAN CREEK

STUDY PLAN

BACKGROUND:

With the Amalgamated Sugar Company intending to withdraw their wastewater from the Nampa STP, a continued discharge to Indian Creek has become the most viable alternative for Nampa's facilities plan. Since a temperature restriction on Nampa's discharge has been dropped and since the initial effluent limits were developed several years ago, the industries discharging to the Nampa STP have requested that the effluent limits be reviewed and possibly updated.

PURPOSE:

Additional data are needed to determine the extent of the toxicity and other pollution problems. Analysis of the information gathered during this survey will help in review of the present effluent limits and help determine the amount of pollution control that is necessary to protect and improve the stream.

SURVEY COORDINATORS: Gene Ralston, Mike Smith

PLAN OF ACTION:

Point Sources:

Effluent samples will be collected from the following point sources:

Facility	NPDES #
Armour & Company	ID-000078-7
Terminal Ice and Cold Storage	ID-000114-7
Birds Eye Now Food Products	None
City of Caldwell Sewage Treatment Plan	ID-002150-4
City of Nampa Sewage Treatment Plant	ID-002206-3

Composite samples will be collected at the Caldwell STP and the Nampa STP. Grab samples will be collected at all other facilities.

Temperature, dissolved oxygen, pH, residual chlorine, and flow will be determined for each effluent when waste samples are collected.

See Crew I Work Plan for additional information.

Instream Water Quality:

Water quality samples will be collected from 12 locations on Indian Creek, from 4 tributary drains and one artesian well. A list of stations and physical and chemical parameters to be determined can be found in Crew II and Crew III Work Plans.

Immediate chlorine demand and residual chlorine will be determine at selected stations and effluents by Crew IV. See Crew IV Work Plan for list of locations and frequencies.

Fish Live Boxes and Electrofishing:

The Department of Fish and Game has agreed to place live boxes, containing hatchery reared rainbow trout, in Indian Creek at selected stations. Electrofishing will also be conducted at those stations. See Crew V Work Plan for details.

Thermographs will be placed at three locations above the Nampa STP and a four parameter (temperature, D.O., pH, sp. cond.) recorder will be installed below the Nampa STP. Crew VI will be responsible for installing the thermographs as well as macroinvertebrate rock basket samplers. See Crew VI Work Plan for thermograph and rock basket sampler locations. Crew I will install the recorder below the Nampa STP when they set up the automatic sampler.

Field determinations of dissolved oxygen, temperature and pH will be made on the Boise River to assess the effect of the Caldwell STP effluent and Indian Creek on the Boise River. See Crew VII Work Plan for station locations and monitoring frequency.

Portions of this survey may be repeated in early 1977.

The following stations will be sampled monthly from January through May:

Robinson Blvd.
Amity Road
North Side Blvd.
Below Nampa STP
Midway Road
At Mouth near Caldwell
Nampa STP effluent

Field and laboratory analyses will be the same at these stations for the monthly monitoring as were done during the intensive survey. Stream discharge will be measured where possible or estimated.

CREW I WORK PLAN

Jon Wroten, George Varin

Point Source Sampling

Vehicle: Blue Suburban

LOCATIONS:

Point sources to be sampled:

Grab Samples:

Armour and Company effluent
Terminal Ice and Cold Storage effluents
Alledged Birds Eye Now Food Products effluent

Composite Samples:

Nampa STP - Two ISCO composite samplers will be set up to sample above the chlorine contact chamber. Sampler 1 will have 1 ml H_2SO_4 in each individual sample bottle and sampler 2 will have 1 ml H_2SO_4 in every other individual sample bottle. Six of the sample sets will be individually analyzed for nitrate and ammonia and compared to determine if the acidified samples in sampler 2 absorb gaseous NH_3 from the non-acidified samples.

Collect one 250 ml sample for bacteriological examination.

LABORATORY ANALYSES:

BOD_5	Sp. Conductance
COD	Alkalinity
Nitrate	Bicarbonate
Nitrite	Carbonate
Ammonia	Chloride
Total Phosphorus	Total Coliform
Ortho Phosphate	Fecal Coliform
Dissolved Solids	Fecal Strep
Suspended Solids	Cadmium
Copper	Lead
Arsenic	Zinc
Mercury	

MULTIPARAMETER RECORDER:

The multiparameter recorder will be set up on Indian Creek below the Nampa STP discharge and above fish live box.

CREW I WORK PLAN

SCHEDULE:

December 6: (afternoon)

1. Set up composite samplers.
2. Set up multiparameter.

December 7:

1. Collect grab samples from Armour, Terminal Ice, and Birds Eye.
2. Determine temperature, D.O., pH, flow, and residual chlorine on above chlorinated effluents.
3. Pick up composite samples and multiparameter recorder.

CREW II AND III WORK PLANS

Crew II: Bill Clark, Mike Smith

Collect water samples and determine field parameters at all Indian Creek and tributary drain stations. (See station list and map).

Vehicle: Green Suburban

Crew III: Gene Ralston, Charles Schwartz

Measure stream discharge at all Indian Creek and tributary drains. (See station list and map).

Vehicle: Trail Duster

INSTREAM WATER QUALITY STATIONS:

Station	STORET Number
Indian Creek:	
at Robinson Rd. Bridge	2040095
at Happy Valley Rd. Bridge*	2040096
at Amity Rd. Bridge	2040097
at 12th Ave. N. (Nampa) Bridge	2040098
at North Side Blvd. (Nampa) Bridge (golf course)	2040099
below Nampa STP discharge	2040100
at Karcher Rd. Bridge	2040101
at Midway Rd. Bridge	2040102
at Lone Tree Ln. Bridge	2040103
above Wilson Drain	2040104
at S. 5th Ave. (Caldwell) Bridge	2040105
near Mouth (Airport Rd.)	2040106
E. Railroad St. Drain	2040107
Moses Drain (Lone Tree Ln.)	2040108
Wilson Drain	2040109
Franklin Rd. Drain (Franklin Rd. & Chicago St.)	2040110
Artesian Well:	
near Robinson Blvd.	--

*Collect two additional 1-liter samples at Happy Valley Rd., ice, deliver to Marty Browne at Nampa STP lab.

CREW II AND III WORK PLANS

PARAMETERS TO BE DETERMINED:

Crew II On-site:

Dissolved Oxygen
Temperature
pH

Collect following samples at each station:

3 one-liter samples. Acidify one with 2 ml H_2SO_4. Ice all three samples.

1 250 ml bacteriological sample for total, fecal, and fecal strep coliform determinations.

LABORATORY ANALYSES ON STREAM SAMPLES:

BOD_5	Turbidity
COD	Sp. Conductance
Nitrate	Alkalinity
Nitrite	Bicarbonate
Ammonia	Carbonate
Total Phosphorus	Chloride
Ortho Phosphate	Total Coliform
Dissolved Solids	Fecal Coliform
Suspended Solids	Fecal Strep
Lead	Zinc
Cadmium	Copper
Arsenic	Mercury

Caldwell STP - A sub-sample from the facility's composite sample will be taken. Collect two one-liter samples, acidify one with 2 ml H_2SO_4, ice both samples. Determine on site: flow, D.O., temperature, pH, residual chlorine on chlorinated effluents. Collect one 250 ml sample for bacteriological examination.

Crew III Stream discharge

SCHEDULE:

Crew II & III

December 7

Begin sampling at upstream station at 8:00 a.m.

CREW IV WORK PLAN

Marty Browne

Immediate Chlorine Demand and Residual Chlorine

Vehicle: Private (Toyota)

Set up necessary equipment and glassware in Nampa STP laboratory. Immediate chlorine demand tests will be performed in STP lab. Residual chlorine will be determined on site with portable titration equipment.

Immediate Chlorine Demand	Frequency
Indian Creek at Happy Valley Rd.	Once/ Dec. 7
Indian Creek at N. Side Blvd.	Twice/Dec. 7

Residual Chlorine	Frequency
Indian Creek:	
N. Side Blvd.	Twice/Dec. 7
below Nampa STP	Twice/Dec. 7
Karcher Blvd.	Twice/Dec. 7
Midway Rd. (if residual Cl_2 found at Karcher Blvd.)	Twice/Dec. 7
Nampa STP effluent	4 times/Dec. 7

CREW V WORK PLAN

Will Reid, Don Martin

Live Boxes and Electrofishing

Vehicle: Fish and Game

PLACE LIVE BOXES AT FOLLOWING STATIONS:

Indian Creek at:

Robinson Blvd.*
Amity Ave.
North Side Blvd. (above Nampa STP)*
Below Nampa STP*
Midway Road*
Above Wilson Drain
5th Ave. and Arthur (Caldwell)

*Priority stations

SCHEDULE:

Place live boxes in stream on Dec. 6. Check four times daily. Remove after 96 hours in stream.

Electrofish on Dec. 7.

FIELD TESTS:

Determine on site:

D.O., temperature, pH, residual Cl_2 when checking live boxes.

WATER SAMPLES:

Obtain a 250 ml sample and acidify with 1 ml H_2SO_4 for ammonia analysis when checking live boxes.

CREW VI WORK PLAN

Bill Clark, Gene Ralston

Thermographs and Rock Basket Samplers

Vehicle: Green Suburban

PLACE THERMOGRAPHS AT FOLLOWING LOCATIONS:

Indian Creek:

1. above Terminal Ice discharge
2. below Terminal Ice discharge and above alledged Birds Eye discharge
3. North Side Blvd. (above Nampa STP)

SCHEDULE:

Place thermographs in stream on Dec. 6. Remove Dec. 9.

PLACE ROCK BASKET SAMPLERS AT FOLLOWING LOCATIONS:

Robinson Blvd.*
Amity Ave.
North Side Blvd.*
Below Nampa STP*
Midway Road*
Above Wilson Drain
5th & Arthur, Caldwell

*Priority stations.

SCHEDULE:

Place rock basket samplers in stream on or before Dec. 6. Remove after 8 weeks.

CREW VII WORK PLAN

Joe Wylie

Boise River Field Data

Vehicle: Dodge Pick-up

Measure temperature, dissolved oxygen, and pH at following locations:

Indian Creek:

Above Wilson Drain
At S. 5th Ave. and Arthur (Caldwell)
Near Mouth (Airport Road)

Boise River:

Old Hwy. 30 Bridge near Caldwell
Simplot Suspension Bridge
Bridge South of Notus
Hwy. 95 Bridge S.E. of Parma
County Bridge West of Parma
Near Mouth (Deer Flat Wildlife Refuge)

SCHEDULE:

Dec. 7, begin at 8:00 a.m. on Indian Creek stations. Repeat Boise River stations only after 1:00 p.m.

APPENDIX B

RAW DATA, STORET RETRIEVAL AND INVENTORY

INDIAN CREEK
August 30 - 31, 1977

Diel Study

ROBINSON ROAD

	TIME	pH	D.O. (mg/l)	TEMP. (°C)
8/30/77	1600	--	11	18
	1800	7.10	6.2	16.5
	2000	7.30	7.6	14.9
	2200	7.30	6.4	14.7
	2400	7.45	6.4	13.4
8/31/77	0200	7.40	6.3	13.2
	0400	7.40	6.4	13.0
	0600	7.50	6.6	13.0
	0800	7.50	7.3	12.0
	1000	7.45	9.5	13.0
	1200	7.60	10.2	13.4
	1400	7.80	11.35	14.7

AMITY ROAD

	TIME	pH	D.O. (mg/l)	TEMP. (°C)
8/30/77	1615	--	7.8	17.8
	1815	7.40	7.4	17.5
	2015	7.50	6.2	17
	2215	7.55	5.8	15.5
8/31/77	0010	7.70	5.8	14.7
	0210	7.60	5.8	13.6
	0410	7.60	5.8	13.4
	0610	7.60	5.8	13.0
	0815	7.60	6.2	12.2
	1020	7.50	7.2	12.5
	1215	7.50	7.9	13.0
	1415	7.60	8.2	14

NORTH SIDE BOULEVARD, NAMPA

	TIME	pH	D.O. (mg/l)	TEMP. (°C)
8/30/77	1630	--	7.4	17.6
	1830	7.80	7.2	17.7
	2027	7.90	6.2	17.4
	2230	7.90	6.0	16.8
8/31/77	0030	7.80	5.6	16.0
	0230	7.80	5.7	15.3
	0430	7.80	5.6	15
	0635	7.70	5.8	14.5
	0828	7.60	5.9	12.9
	1035	7.50	6.8	13.6
	1230	7.60	7.2	13.8
	1430	7.70	8.1	14.5

MIDWAY ROAD

	TIME	pH	D.O. (mg/l)	TEMP. (°C)
8/30/77	1700	--	4	18
	1900	7.65	3.3	17.6
	2050	7.70	2.7	17
	2252	7.35	2.4	17
8/31/77	0050	7.30	2.4	16.2
	0250	7.80	2.35	15.3
	0450	7.75	2.4	15.5
	0655	7.60	2.9	15
	0853	7.55	3.1	14.6
	1100	7.50	4.1	14.7
	1250	7.60	4.3	14.8
	1452	7.55	4.3	15

BENTHIC MACROINVERTEBRATES - Indian Creek, January 19-20, 1977

ORGANISM	SAMPLE STATIONS (Mean Number/Rock Basket)					
	Robinson Rd.	Amity Ave.	N. Side Blvd.	Below Nampa STP	Midway Rd.	Caldwell
MOLLUSCA						
Gastropoda						
Basommatophora						
Lymnaeidae						
Lymnaea sp.	0.5	0	0.3	0	0	0
Physidae						
Physa sp.	3	0	1.3	2*	1.3	0
Pelecypoda						
Sphaeriidae	4.5	0.3*	0.3	0	8.3	0
PLATYHELMINTHES						
Turbellaria						
Tricladida						
Planariidae						
Dugesia dorotocephala (Woodworth)[1]			18	0		
Dugesia spp.	39	1.3	0	0	4.3	0.7
NEMATODA	0.5	0.3	0	0	0	0
ANNELIDA						
Oligochaeta	2.5	0.7	0	0.5	3	0
Hirudinea						
sp.A	8.5	1.6	0	0	2	0
sp.B	2	0.7	5.7	0	1.3	0.3

*Empty shell
[1]Det. S.E. Nixon

BENTHIC MACROINVERTEBRATES - Indian Creek, January 19-20, 1977

ORGANISM	SAMPLE STATIONS (Mean Number/Rock Basket)					
	Robinson Rd.	Amity Ave.	N. Side Blvd.	Below Nampa STP	Midway Rd.	Caldwell
ARTHROPODA						
CRUSTACEA						
Isopoda						
Asellidae						
<u>Asellus</u> sp.	0	0	52	161	34	4.3
Amphipoda						
Gammaridae	13	12	10**	0	1.3	0.3
INSECTA						
Ephemeroptera (N)						
Baetidae						
<u>Baetis</u> sp.	2.5	0	4.3	0	4.3	5
Ephemerellidae						
<u>Ephemerella</u> sp.	4	0	1	0	0.3	0
Odonata (N)						
Coenagrionidae						
<u>Ischnura</u> sp.	3	98.3	0	0.3	1.7	0.3
Aeshnidae						
<u>Aeshna</u> sp.	0	0.3	0	0	0	0
Coleoptera						
Dytiscidae	0	0	0	0	0.3	0
Trichoptera (L)						
Hydropsychidae	0	0.3	0	0.3	0	235.3
Brachycentridae						
<u>Brachycentrus</u> sp.	0	0	0	0	0	0.7
Unidentified Empty Case	0	0	0	0	0	0.7

**1 with eggs
(N) Nymphal stage
(L) Larval stage

BENTHIC MACROINVERTEBRATES - Indian Creek, January 19-20, 1977

ORGANISM	SAMPLE STATIONS (Mean Number/Rock Basket)					
	Robinson Rd.	Amity Ave.	N. Side Blvd.	Below Nampa STP	Midway Rd.	Caldwell
INSECTA (continued)						
Diptera						
Psychodidae						
Psychoda sp. (P)	0	0.3	0	13.5	5.7	0.3
(L)	0	0	0	0	0.7	0
(E)	0	0	0	3.5	0	0
Ceratopogonidae						
Palpomyia sp. (L)	7	0.3	0	0	0.3	0
Chironomidae						
sp.A (L)	4	23.3	0.7	0.3	0.7	0
sp.B (L)	3	0.7	3.7	0	0	6.3
(P)	0	0.3	0	0	0	0
Simuliidae (L)	1	17.3	0	0	0.7	3
Stratiomyidae (L)	0.3	0.3	0	0	1	0
Empidae (L)	0	0.3	0	0	0	0
Muscidae						
Limnophora sp.	1	1.3	0	0	0	0
sp.	0.3	3	0.3	0	0.3	0
Acachnida						
Acari	0	0.7	0	0	0	0
MEAN NUMBER/STATION	100	166	97.7	182.5	71.7	257.3

(P) Pupal stage
(L) Larval stage
(E) Exuvia

STORET DATE 79/05/04

2040095
43 52 50.0 116 29 30.0 5
INDIAN CRK. ROBINSON BLVD.
16027 IDAHO
PACIFIC NORTHWEST 130704
MIDDLE SNAKE RIVER BASIN
21IDSURV 770201
0000 CLASS 00

/TYPA/AMBNT/STREAM

INDEX 1310001 002740 06150 0220
MILES 0324.30 0391.30 019.70 015.60

PARAMETER			NUMBER	MEAN	VARIANCE	STAN DEV	COEF VAR	STAND ER	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010 WATER	TEMP	CENT	11	9.90909	1.79094	1.33826	.135054	.403501	12.0000	8.50000	76/12/07	77/08/31
00061 STREAM	FLOW,	INST-CFS	7	15.2857	18.9048	4.34797	.284446	1.64338	20.0000	7.00000	76/12/07	77/05/25
00070 TURB	JKSN	JTU	9	3.92222	8.09698	2.84552	.725487	.948506	8.00000	.700000	76/12/07	77/05/25
00095 CNDUCTVY	AT 25C	MICROMHO	9	730.778	4119.75	64.1853	.087831	21.3951	828.000	635.000	76/12/07	77/05/25
00300 DO		MG/L	11	9.54545	2.15276	1.46723	.153710	.442386	11.8000	7.50000	76/12/07	77/08/31
00310 BOD	5 DAY	MG/L	11	1.05000	.609499	.780704	.743528	.235391	2.40000	.100000	76/12/07	77/08/31
00335 COD	LOWLEVEL	MG/L	11	14.7909	180.721	13.4432	.908886	4.05329	53.5000	5.60000	76/12/07	77/08/31
00400 PH		SU	11	7.64545	.190723	.436718	.057121	.131675	8.00000	6.80000	76/12/07	77/08/31
00403 LAB	PH	SU	3	8.16666	.003510	.059241	.007254	.034203	8.20000	8.10000	77/03/08	77/05/25
00410 T ALK	CACO3	MG/L	11	241.273	304.831	17.4594	.072364	5.26421	261.000	220.000	76/12/07	77/08/31
00425 HCO3 ALK	CACO3	MG/L	11	239.818	274.575	16.5703	.069095	4.99613	261.000	220.000	76/12/07	77/08 31
00430 CO3 ALK	CACO3	MG/L	11	2.36364	20.4545	4.52267	1.91344	1.36364	16.0000	1.00000	76/12/07	77/08/31
00530 RESIDUE	TOT NFLT	MG/L	10	15.4000	104.044	10.2002	.662352	3.22559	37.0000	2.00000	76/12/07	77/08/31
00610 NH3-N	TOTAL	MG/L	9	.070111	.002825	.053147	.758041	.017716	.200000	.030000	76/12/07	77/05/25
00615 NO2-N	TOTAL	MG/L	11	.013455	.000021	.004569	.339567	.001378	.022000	.007000	76/12/07	77/08/31
00620 NO3-N	TOTAL	MG/L	11	4.29181	13.0721	3.61554	.842428	1.09013	14.9000	1.65000	76/12/07	77/08/31
00625 TOT KJEL	N	MG/L	10	.815000	.316361	.562460	.690135	.177865	1.72000	.060000	77/01/12	77/08/31
00665 PHOS-TOT		MG/L P	3	.183333	.000233	.015275	.083318	.008819	.200000	.170000	76/12/07	77/08/31
[illegible]	CL	MG/L	9	19.1333	7.62997	2.76224	.144368	.920747	24.0000	16.0000	76/12/07	77/05/25
01002 ARSENIC	AS,TOT	UG/L	3	10.0000	.000000	.000000		.000000	10.0000	10.0000	76/12/07	77/08/31
01027 CADMIUM	CD,TOT	UG/L	3	2.33333	5.33334	2.30940	.989744	1.33333	5.00000	1.00000	76/12/07	77/08/31
01042 COPPER	CU,TOT	UG/L	3	10.0000	.000000	.000000		.000000	10.0000	10.0000	76/12/07	77/08/31
01051 LEAD	PB,TOT	UG/L	3	36.6667	533.334	23.0940	.629838	13.3333	50.0000	10.0000	76/12/07	77/08/31
01092 ZINC	ZN,TOT	UG/L	3	2.00000	1.00000	1.00000	.500000	.577350	3.00000	1.00000	76/12/07	77/08/31
31501 TOT COLI	MFIMENDO	/100ML	10	3533.00	.1336E+08	3655.98	1.03481	1156.12	12800.0	250.000	76/12/07	77/08/31
31616 FEC COLI	MFM-FCBR	/100ML	9	1582.22	2193644	1481.10	.936086	493.698	5300.00	340.000	77/01/12	77/08/31
31679 FECSTREP	MF M-ENT	/100ML	10	858.500	518545	720.101	.838789	227.716	2200.00	95.0000	76/12/07	77/08/31
70300 RESIDUE	DISS-180	C MG/L	3	431.666	2564.56	50.6415	.117316	29.2379	490.000	399.000	76/12/07	77/08/31
70507 PHOS-T	ORTHO	MG/L P	3	.121667	.000456	.021362	.175578	.012333	.134000	.097000	76/12/07	77/08/31
71900 MERCURY	HG,TOTAL	UG/L	3	2.00000	6.75000	2.59808	1.29904	1.50000	5.00000	.500000	76/12/07	77/08/31

STORET RETRIEVAL DATE 79/05/05

2040095
43 52 50.0 116 29 30.0 5
INDIAN CRK. ROBINSON BLVD.
16027 IDAHO
PACIFIC NORTHWEST 130704
MIDDLE SNAKE RIVER BASIN
21IDSURV 770201
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00061 STREAM FLOW, INST-CFS	00300 DO MG/L	00310 BOD 5 DAY MG/L	00335 COD LOWLEVEL MG/L	00340 COD HI LEVEL MG/L	00400 PH SU	00403 LAB PH SU	31501 TOT COLI MFIMENDO /100ML	31616 FEC COLI MFM-FCBR /100ML
76/12/07	08 30		9.0	7	9.8	1.6	11.0		7.60		12000	
77/01/12	08 45		8.5		10.1	2.3	18.6		7.90		5500	530.
	08 50		8.5		10.1	2.4	5.6		7.90		4800	117.
77/02/09	13 00		9.0	15J	9.9	0.5	11.0		7.90		2400	150.
77/03/08	07 30		9.0	15J	9.5	0.1K	8.8		7.80	8.1	3000	147
77/04/19	08 30		9.5	15J	11.8	1.2	6.4		8.00	8.2	380	61.
	09 00		9.5	15J	11.8	0.8	7.4		8.00		250	34.
77/05/25	08 30		11.0	20J	8.5	0.7	11.0		6.80	8.2	2300	100.
	08 45		11.0	20J	8.5	1.1	53.5		6.80		2700	200.
77/08/31	07 20		12.0		7.5	0.8	16.4		7.70		1700	85.
	07 45		12.0		7.5	0.1K	13.0		7.70			

DATE FROM TO	TIME OF DAY	DEPTH FEET	31679 FECSTREP MF M-ENT /100ML	00610 NH3-N TOTAL MG/L	00615 NO2-N TOTAL MG/L	00620 NO3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00665 PHOS-TOT MG/L P	00669 PHOS-TOT HYDRO MG/L P	70507 PHOS-T ORTHO MG/L P	00070 TURB JKSN JTU	00095 CNDUCTVY AT 25C MICROMHO
76/12/07	08 30		95	0.080	0.019	3.600		0.170		0.097	3.5	756
77/01/12	08 45		2200	0.092	0.007	4.090	0.810				3.5	77.
	08 50		2000	0.057	0.014	3.900	0.750				3.3	825
77/02/09	13 00		1000	0.200	0.010	3.740	1.180				5.0	670
77/03/08	07 30		500	0.040	0.016	4.140	0.600				6.7	600
77/04/19	08 30		460	0.030	0.010	3.150	0.500				1.0	635
	09 00		360	0.040	0.012	3.220	0.900				1.1	693
77/05/25	08 30		1100	0.032	0.017	2.990	0.000				6.7	698
	08 45		500	0.060	0.022	14.900	0.000				7.5	719
77/08/31	07 20		370		0.010	1.830	1.720	0.200		0.134		
	07 45				0.011	1.650	1.490	0.180		0.134		

STORET RETRIEVAL DATE 79/05/05

/TYPA/AMBNT/STREAM

2040095
43 52 50.0 116 29 30.0 5
INDIAN CRK. ROBINSON BLVD.
16027 IDAHO
PACIFIC NORTHWEST 130704
MIDDLE SNAKE RIVER BASIN
21IDSURV 770201
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00530 RESIDUE TOT NFLT MG/L	70300 RESIDUE DISS-180 C MG/L	00410 T ALK CACO3 MG/L	00425 HCO3 ALK CACO3 MG/L	00430 CO3 ALK CACO3 MG/L	00940 CHLORIDE CL MG/L	50060 CHLORINE TOT RESD MG/L	01002 ARSENIC AS,TOT UG/L	01027 CADMIUM CD,TOT UG/L	01042 COPPER CU,TOT UG/L
76/12/07	08 30		13	490	258	242	16	19		10K	5K	10K
77/01/12	08 45		9		260	260	1K	19				
	08 50		16		261	261	1K	22				
77/02/09	13 00		37		254	254	1K	21				
77/03/08	07 30		6		261	261	1K	24				
77/04/19	08 30				235	235	1K	17				
	09 00		2		234	234	1K	18				
77/05/25	08 10		18		220	220	1K	16				
	08 45		27		223	223	1K	16				
77/08/31	07 20		12	399	223	223	1K			10K	1K	10
	07 45		14	406	225	225	1K			10K	1K	10K

DATE FROM TO	TIME OF DAY	DEPTH FEET	01051 LEAD PB,TOT UG/L	01092 ZINC ZN,TOT UG/L	71900 MERCURY HG,TOTAL UG/L	00042 ALTITUDE FEET AB MSL
76/12/07	08 30		10K	2	5.0K	
77/08/31	07 20		50K	3	0.5	
	07 45		50K	1K	0.5K	

STORET DATE 79/05/04

2040097
43 33 45.0 116 31 43.0 5
INDIAN CRK. AMITY AVENUE
16027 IDAHO
PACIFIC NORTHWEST 130704
MIDDLE SNAKE RIVER BASIN
/TYPA/AMBNT/STREAM
21IDSURV 770201
0000 CLASS 00

INDEX 1310001 002740 06150 0220
MILES 0324.30 0391.30 019.70 013.50

PARAMETER			NUMBER	MEAN	VARIANCE	STAN DEV	COEF VAR	STAND ER	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010 WATER	TEMP	CENT	7	9.35714	6.89290	2.62543	.280581	.992321	14.0000	6.00000	76/12/07	77/08/31
00042 ALTITUDE	FEET	AB MSL	1	2500.00					2500.00	2500.00	01/01/01	01/01/01
00061 STREAM	FLOW,	INST-CFS	4	26.2500	56.2500	7.50000	.285714	3.75000	30.0000	15.0000	76/12/07	77/04/1[illegible]
00070 TURB	JKSN	JTU	6	7.13333	65.6147	8.10029	1.13556	3.30693	23.0000	1.80000	76/12/07	77/05/2[illegible]
00095 CNDUCTVY	AT 25C	MICROMHO	5	665.380	138430	372.062	.559172	166.391	910.000	8.90000	76/12/07	77/05/25
00300 DO		MG/L	7	8.78571	.641479	.800924	.091162	.302721	9.60000	7.20000	76/12/07	77/08/31
00310 BOD	5 DAY	MG/L	7	3.38571	5.94480	2.43820	.720144	.921552	7.20000	.300000	76/12/07	77/08/31
00335 COD	LOWLEVEL	MG/L	7	17.3571	33.9098	5.82321	.335494	2.20097	25.0000	11.0000	76/12/07	77/08/31
00400 PH		SU	7	7.59999	.150024	.387330	.050965	.146397	7.90000	6.80000	76/12/07	77/08/31
00403 LAB	PH	SU	1	7.90000					7.90000	7.90000	77/03/08	77/03/08
00410 T ALK	CACO3	MG/L	6	267.000	469.600	21.6703	.081162	8.84685	286.000	235.000	76/12/07	77/08/31
00425 HCO3 ALK	CACO3	MG/L	6	260.333	608.325	24.6642	.094741	10.0691	280.000	224.000	76/12/07	77/08/31
00430 CO3 ALK	CACO3	MG/L	5	4.80000	72.2000	8.49706	1.77022	3.80000	20.0000	1.00000	76/12/07	77/05/25
00530 RESIDUE	TOT NFLT	MG/L	6	40.0000	993.600	31.5214	.788036	12.8686	79.0000	7.00000	76/12/07	77/08/31
00610 NH3-N	TOTAL	MG/L	4	2.38750	.528091	.726699	.304377	.363349	3.42000	1.72000	76/12/07	77/05/2[illegible]
00615 NO2-N	TOTAL	MG/L	6	.078167	.003277	.057245	.732344	.023370	.163000	.024000	76/12/07	77/08/31
00620 NO3-N	TOTAL	MG/L	7	3.34571	.086113	.293450	.087709	.110914	3.83000	2.93000	76/12/07	77/08/31
00625 TOT KJEL	N	MG/L	5	3.41600	2.16311	1.47075	.430549	.657741	4.70000	1.16000	77/01/12	77/08/31
00665 PHOS-TOT		MG/L P	2	.415000	.008450	.091924	.221503	.065000	.480000	.350000	76/12/07	77/08/31
00940 CHLORIDE	CL	MG/L	5	31.8000	8.20117	2.86377	.090056	1.28072	35.0000	28.0000	76/12/07	77/05/2[illegible]
01002 ARSENIC	AS,TOT	UG/L	2	10.0000	.000000	.000000		.000000	10.0000	10.0000	76/12/07	77/08/31
01027 CADMIUM	CD,TOT	UG/L	2	3.00000	8.00000	2.82843	.942809	2.00000	5.00000	1.00000	76/12/07	77/08/31
01042 COPPER	CU,TOT	UG/L	2	10.0000	.000000	.000000		.000000	10.0000	10.0000	76/12/07	77/08/31
01051 LEAD	PB,TOT	UG/L	2	30.0000	800.000	28.2843	.942809	20.0000	50.0000	10.0000	76/12/07	77/08/31
01092 ZINC	ZN,TOT	UG/L	2	9.50000	144.500	12.0208	1.26535	8.50000	18.0000	1.00000	76/12/07	77/08/31
31501 TOT COLI	MFIMENDO	/100ML	8	9100.00	.100E+09	10022.3	1.10135	3543.40	28000.0	500.000	76/12/07	77/08/31
31616 FEC COLI	MFM-FCBR	/100ML	7	1504.29	1193129	1092.30	.726128	412.852	3000.00	100.000	77/01/12	77/08/31
31679 FECSTREP	MF M-ENT	/100ML	8	4810.00	.139E+09	11817.1	2.45678	4177.98	34000.0	100.000	76/12/07	77/08/31
50060 CHLORINE	TOT RESD	MG/L	2	.000000	.000000	.000000		.000000	.000000	.000000	77/04/19	77/05/25
70300 RESIDUE	DISS-180	C MG/L	2	463.500	3612.50	60.1041	.129674	42.5000	506.000	421.000	76/12/07	77/08/31
70507 PHOS-T	ORTHO	MG/L P	2	.358500	.009941	.099702	.278110	.070500	.429000	.288000	76/12/07	77/08/31
71900 MERCURY	HG,TOTAL	UG/L	2	2.75000	10.1250	3.18198	1.15708	2.25000	5.00000	.500000	76/12/07	77/08/31

STORET RETRIEVAL DATE 79/05/05

2040097
43 33 45.0 116 31 43.0 5
INDIAN CRK. AMITY AVENUE
16027 IDAHO
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211DSORV 770201
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00061 STREAM FLOW, INST-CFS	00300 DO MG/L	00310 BOD 5 DAY MG/L	00335 COD LOWLEVEL MG/L	00340 COD HI LEVEL MG/L	00400 PH SU	00403 LAB PH SU	31501 TOT COLI MFIMENDO /100ML	31616 FEC COLI MFM-FCBR /100ML
76/12/07	09 30		9.0	15	9.4	5.3	20.7		7.90		5560	
77/01/12	09 30		6.0		8.8	7.2	23.3		7.80		28000	3000
	09 35										13000	1060
77/02/09	11 45		9.0	30J	9.1	4.3	25.0		7.70		19000	3000
77/03/08	08 15		8.0	30J	9.0	0.3	11.4		7.80	7.9	500	10[illegible]
77/04/19	09 45		8.0	30J	9.6	2.2	11.0		7.80		1100	1350
77/05/25	09 00		11.5		8.4	3.4	17.5		6.80		4200	100
77/08/31	08 45		14.0		7.2	1.0	12.6		7.40		1500	1000

DATE FROM TO	TIME OF DAY	DEPTH FEET	31679 FECSTREP MF M-ENT /100ML	00610 NH3-N TOTAL MG/L	00615 NO2-N TOTAL MG/L	00620 NO3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00665 PHOS-TOT MG/L P	00669 PHOS-TOT HYDRO MG/L P	70507 PHOS-T ORTHO MG/L P	00070 TURB JKSN JTU	00095 CNDUCTVY AT 25C MICROMHO
76/12/07	09 30		210	2.150	0.071	3.430		0.480		0.429	4.1	84[illegible]
77/01/12	09 30		34000J		0.024	3.830	3.640				23.0	828
	09 35		2300J									
77/02/09	11 45		900		0.031	3.120	4.680				1.8	736
77/03/08	08 15		100	2.260	0.047	3.440	2.900				3.5	91[illegible]
77/04/19	09 45		270	1.720		3.190					2.2	
77/05/25	09 00		600	3.420	0.133	3.480	4.700				8.2	[illegible]
77/08/31	08 45		100K		0.163	2.930	1.160	0.350		0.280		

STORET RETRIEVAL DATE 79/05/05

2040097
43 33 45.0 116 31 43.0 5
INDIAN CRK. AMITY AVENUE
16027 IDAHO
PACIFIC NORTHWEST 130704
MIDDLE SNAKE RIVER BASIN
21IDSURV 770201
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00530 RESIDUE TOT NFLT MG/L	70300 RESIDUE DISS-180 C MG/L	00410 T ALK CACO3 MG/L	00425 HCO3 ALK CACO3 MG/L	00430 CO3 ALK CACO3 MG/L	00940 CHLORIDE CL MG/L	50060 CHLORINE TOT RESD MG/L	01002 ARSENIC AS,TOT UG/L	01027 CADMIUM CD,TOT UG/L	01042 COPPER CU,TOT UG/L
76/12/07	09 30		33	506	286	266	20	30		10K	5K	10K
77/01/12	09 30		78		280	280	1K	32				
77/02/09	11 45		79		278	278	1K	34				
77/03/08	08 15		12		279	279	1K	35				
77/04/19	09 45								0.00			
77/05/25	09 00		31		244	224	1K	28	0.00			
77/08/31	08 45		7	421	235	235				10K	1K	10K

DATE FROM TO	TIME OF DAY	DEPTH FEET	01051 LEAD PB,TOT UG/L	01092 ZINC ZN,TOT UG/L	71900 MERCURY HG,TOTAL UG/L	00042 ALTITUDE FEET AB MSL
01/01/61						2500
76/12/07	09 30		10K	18	5.0K	
77/08/31	08 45		50K	1	0.5	

STORET DATE 79/05/04

2040099
43 35 40.0 116 34 45.0 5
INDIAN CRK. NORTH SIDE BLVD.
16027 IDAHO
PACIFIC NORTHWEST 130704
MIDDLE SNAKE RIVER BASIN
21IDSURV 770201
0000 CLASS 00

/TYPA/AMBNT/STREAM

INDEX 1310001 002740 06150 0220
MILES 0324.30 0391.30 019.70 010.00

PARAMETER				NUMBER	MEAN	VARIANCE	STAN DEV	COEF VAR	STAND ER	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT	12	11.3333	3.78791	1.94625	.171728	.561835	15.0000	8.00000	76/12/07	77/08/31
00042	ALTITUDE	FEET	AB MSL	1	2500.00					2500.00	2500.00	01/01/01	01/01/01
00061	STREAM	FLOW,	INST-CFS	8	36.1250	28.6964	5.35690	.148288	1.89395	40.0000	29.0000	76/12/07	77/05/25
00070	TURB	JKSN	JTU	10	7.13000	32.9335	5.73877	.804876	1.81476	15.0000	.800000	76/12/07	77/05/25
00095	CNDUCTVY	AT 25C	MICROMHO	10	761.400	6480.78	80.5033	.105731	25.4574	858.000	632.000	76/12/07	77/05/25
00300	DO		MG/L	12	8.43333	.491544	.701102	.083135	.202391	9.30000	7.50000	76/12/07	77/08/31
00310	BOD	5 DAY	MG/L	12	2.95833	4.12631	2.03133	.686648	.586395	5.80000	.400000	76/12/07	77/08/31
00335	COD	LOWLEVEL	MG/L	12	11.1167	29.0107	5.38615	.484512	1.55485	19.0000	2.60000	76/12/07	77/08/31
00400	PH		SU	12	7.60833	.122669	.350242	.046034	.101106	7.90000	6.90000	76/12/07	77/08/31
00403	LAB	PH	SU	8	8.13749	.014195	.119143	.01464	.042123	8.30000	8.00000	77/01/12	77/05/2
00410	T ALK	CACO3	MG/L	13	257.154	432.333	20.7926	.080857	5.76683	299.000	226.000	76/12/07	77/08/31
00425	HCO3 ALK	CACO3	MG/L	13	250.231	291.036	17.0598	.068176	4.73153	272.000	226.000	76/12/07	77/08/31
00430	CO3 ALK	CACO3	MG/L	13	2.46154	27.7692	5.26965	2.14080	1.46154	20.0000	1.00000	76/12/07	77/08/31
00530	RESIDUE	TOT NFLT	MG/L	12	24.5833	332.811	18.2431	.742093	5.26633	58.0000	2.00000	76/12/07	77/08/31
00610	NH3-N	TOTAL	MG/L	10	.880399	.206402	.454315	.516032	.143667	1.72000	.260000	76/12/07	77/05/25
00615	NO2-N	TOTAL	MG/L	12	.144833	.005093	.071367	.492755	.020602	.288000	.052000	76/12/07	77/08/31
00620	NO3-N	TOTAL	MG/L	12	2.76749	.463642	.680913	.246039	.196563	3.58000	1.34000	76/12/07	77/08/31
00625	TOT KJEL	N	MG/L	11	1.58545	.585950	.765473	.482811	.230799	2.68000	.000000	77/01/12	77/08/31
00665	PHOS-TOT		MG/L P	3	.306667	.000133	.011545	.037645	.006665	.320000	.300000	76/12/07	77/08/31
00940	CHLORIDE	CL	MG/L	10	26.6700	11.8459	3.44179	.129051	1.08839	32.0000	20.0000	76/12/07	77/05/25
01002	ARSENIC	AS,TOT	UG/L	6	10.0000	.000000	.000000		.000000	10.0000	10.0000	76/12/07	77/08/31
01027	CADMIUM	CD,TOT	UG/L	6	2.33333	4.26667	2.06559	.885254	.843274	5.00000	1.00000	76/12/07	77/08/31
01042	COPPER	CU,TOT	UG/L	6	10.0000	.000000	.000000		.000000	10.0000	10.0000	76/12/07	77/08/31
01051	LEAD	PB,TOT	UG/L	6	38.3333	336.667	18.3485	.478656	7.49074	50.0000	10.0000	76/12/07	77/08/31
01092	ZINC	ZN,TOT	UG/L	6	5.66667	6.26669	2.50334	.441765	1.02198	8.00000	1.00000	76/12/07	77/08/31
31501	TOT COLI	MFIMENDO	/100ML	12	3076.67	.134E+08	3673.51	1.19399	1060.45	10300.0	30.0000	76/12/07	77/08/31
31616	FEC COLI	MFM-FCBR	/100ML	11	658.182	256677	506.633	.769746	152.756	1500.00	150.000	77/01/12	77/08/31
31679	FECSTREP	MF M-ENT	/100ML	12	251.667	65287.9	255.515	1.01529	73.7608	1000.00	50.0000	76/12/07	77/08/31
70300	RESIDUE	DISS-180	C MG/L	2	475.500	544.500	23.3345	.049074	16.5000	492.000	459.000	76/12/07	77/08/31
70507	PHOS-T	ORTHO	MG/L P	3	.253667	.000234	.015307	.060343	.008838	.271000	.242000	76/12/07	77/08/31
71900	MERCURY	HG,TOTAL	UG/L	3	2.00000	6.75000	2.59808	1.29904	1.50000	5.00000	.500000	76/12/07	77/08/31

STORET RETRIEVAL DATE 79/05/05

2040099
43 35 40.0 116 34 45.0 5
INDIAN CRK.   NORTH SIDE BLVD.
16027   IDAHO
PACIFIC NORTHWEST   130704
MIDDLE SNAKE RIVER BASIN
21IDSURV 770201
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00061 STREAM FLOW, INST-CFS	00300 DO MG/L	00310 BOD 5 DAY MG/L	00335 COD LOWLEVEL MG/L	00340 COD HI LEVEL MG/L	00400 PH SU	00403 LAB PH SU	31501 TOT COLI MFIMENDO /100ML	31616 FEC COLI MFM-FCBR /100ML
76/12/07	11 15		11.0	29	7.7	5.2	11.9		7.90		10300	
77/01/12	11 00		8.0		8.0	5.8	14.7		7.60	8.1	8500	140[illegible]
	11 05		8.0		8.0	5.0	15.1		7.60	8.0	6500	150[illegible]
77/02/09	14 00		11.0	40J	9.3	4.8	17.0		7.70		5500	110[illegible]
	14 30		11.0	40J	9.3	5.2	19.0		7.70		3000	100[illegible]
77/03/08	09 30		11.0	40J	8.7	2.0	8.6		7.80	8.1	1000	10[illegible]K
	10 00		11.0	40J	8.7	1.6	5.6		7.80	8.0	300	20[illegible]
77/04/19	10 45		12.5	30J	9.2	1.2	2.6		7.90	8.1	30	31[illegible]
	11 00		12.5	30	9.2	1.0	3.8		7.90	8.2	110	28[illegible]
77/05/25	09 30		12.5	40J	7.8	1.8	10.4		6.90	8.3	520	45[illegible]
	09 45		12.5		7.8	1.5	8.7		6.90	8.3	510	65[illegible]
77/08/31	10 30		15.0		7.5	0.4	16.0		7.60		850	25[illegible]

DATE FROM TO	TIME OF DAY	DEPTH FEET	31679 FECSTREP MF M-ENT /100ML	00610 NH3-N TOTAL MG/L	00615 NO2-N TOTAL MG/L	00620 NO3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00665 PHOS-TOT MG/L P	00669 PHOS-TOT HYDRO MG/L P	70507 PHOS-T ORTHO MG/L P	00070 TURB JKSN JTU	00095 CNDUCTVY AT 25C MICROMHO
76/12/07	11 15		100K	0.820	0.217	2.870		0.300		0.248	7.5	78[illegible]
77/01/12	11 00		200J	0.930	0.052	3.580	2.010				15.0	82[illegible]
	11 05		400	0.820	0.056	3.240	2.060				15.0	82[illegible]
77/02/09	14 00		200	1.530	0.086	2.810	2.680				12.0	68[illegible]
	14 30		1000K	1.720	0.096	2.920	2.680				11.0	69[illegible]
77/03/08	09 30		100K	0.930	0.196	3.260	1.600				2.0	85[illegible]
	10 00		100K	0.840	0.203	3.160	1.500				2.2	85[illegible]
77/04/19	10 45		50	0.420	0.171	2.870	1.300				..8	70[illegible]
	11 00		120	0.260	0.121	2.930	1.100				1.0	63[illegible]
77/05/25	09 30		280	0.534	0.288	2.770	0.000				4.8	74[illegible]
	09 45		270									
77/08/31	10 15				0.127	1.340	1.280	0.320		0.271		
	10 30		200		0.125	1.460	1.230	0.300		0.242		

STORET RETRIEVAL DATE 79/05/05

2040099
43 35 40.0 116 34 45.0 5
INDIAN CRK. NORTH SIDE BLVD.
16027 IDAHO
PACIFIC NORTHWEST 130704
MIDDLE SNAKE RIVER BASIN
21IDSURV 770201
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00530 RESIDUE TOT NFLT MG/L	70300 RESIDUE DISS-180 C MG/L	00410 T ALK CACO3 MG/L	00425 HCO3 ALK CACO3 MG/L	00430 CO3 ALK CACO3 MG/L	00940 CHLORIDE CL MG/L	50060 CHLORINE TOT RESD MG/L	01002 ARSENIC AS,TOT UG/L	010.7 CADMIUM CD,TOT UG/L	01042 COPPER CU,TOT UG/L
76/12/07	11 15		31	492	270	250	20	25		10K	5K	10K
77/01/12	11 00		49		272	272	1K	25				
	11 05		58		268	268	1K	26				
77/02/09	14 00		37		261	261	1K	28		10K	5K	10
	14 30		37		260	260	1K	32				
77/03/08	09 30				266	266	1K	30		10K	1K	10K
	10 00		10		266	266	1K	30		10K	1K	10K
77/04/19	10 45		7		251	251	1K	25				
	11 00		2		247	247	1K	26				
77/05/25	09 30		22		228	228	1K	20				
	09 45		18		299	229	1K					
77/08/31	10 15		2	459	229	229	1K			10K	1K	10K
	10 30		22		226	226	1K			10K	1K	10K

DATE FROM TO	TIME OF DAY	DEPTH FEET	01051 LEAD PB,TOT UG/L	01092 ZINC ZN,TOT UG/L	71900 MERCURY HG,TOTAL UG/L	00042 ALTITUDE FEET AB MSL
01/01/01						2500
76/12/07	11 15		10K	8	5.0K	
77/02/09	14 00		20	7		
77/03/08	09 30		50K	7		
	10 00		50K	5		
77/08/31	10 15		50K	1	0.5K	
	10 30		50K	6	0.5K	

STORET DATE 79/05/04

2040100
43 36 10.0 116 35 15.0 5
INDIAN CRK. BELOW NAMPA STP
16027 IDAHO
PACIFIC NORTHWEST 130704
MIDDLE SNAKE RIVER BASIN
21IDSURV 770203
0000 CLASS 00

/TYPA/AMBNT/STREAM

INDEX 1310001 002740 06150 0220
MILES 0324.30 0391.30 019.70 009.00

PARAMETER			NUMBER	MEAN	VARIANCE	STAN DEV	COEF VAR	STAND ER	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010 WATER	TEMP	CENT	14	13.0000	4.23077	2.05688	.158222	.549725	16.0000	10.0000	76/12/07	77/08/31
00042 ALTITUDE	FEET	AB MSL	1	2500.00					2500.00	2500.00	01/01/01	01/01/01
00061 STREAM	FLOW,	INST-CFS	10	54.0000	71.1111	8.43274	.156162	2.66667	70.0000	50.0000	76/12/07	77/05/25
00070 TURB	JKSN	JTU	14	9.69285	33.8392	5.81715	.600148	1.55470	21.0000	3.60000	76/12/07	77/08/31
00095 CNDUCTVY	AT 25C	MICROMHO	14	1032.64	28916.5	170.048	.164673	45.4473	1302.00	780.000	76/12/07	77/08/31
00300 DO		MG/L	14	6.80000	.563082	.750388	.110351	.200550	8.00000	6.00000	76/12/07	77/08/31
00310 BOD	5 DAY	MG/L	12	13.2833	153.329	12.3826	.932191	3.57455	43.0000	4.60000	76/12/07	77/08/31
00335 COD	LOWLEVEL	MG/L	10	39.4299	361.891	19.0234	.482461	6.01573	75.6000	21.6000	76/12/07	77/08/31
00340 COD	HI LEVEL	MG/L	4	137.000	2198.67	46.8899	.342262	23.4450	204.000	100.000	77/01/12	77/02/09
00400 PH		SU	14	7.48571	.072078	.268473	.035865	.071752	7.70000	6.90000	76/12/07	77/08/31
00403 LAB	PH	SU	2	7.80000	.000000	.000000		.000000	7.80000	7.80000	77/03/08	77/03/08
00410 T ALK	CACO3	MG/L	14	315.428	2498.92	49.9892	.158480	13.3602	376.000	241.000	76/12/07	77/08/31
00425 HCO3 ALK	CACO3	MG/L	14	312.571	2258.92	47.5281	.152055	12.7024	372.000	241.000	76/12/07	77/08/31
00430 CO3 ALK	CACO3	MG/L	14	3.71428	57.4505	7.57961	2.04067	2.02574	28.0000	1.00000	76/12/07	77/08/31
00530 RESIDUE	TOT NFLT	MG/L	14	28.7857	356.798	18.8891	.656197	5.04832	66.0000	5.00000	76/12/07	77/08/31
00610 NH3-N	TOTAL	MG/L	13	6.88222	15.1621	3.89386	.565785	1.07996	13.4000	.159000	76/12/07	77/08/31
00615 NO2-N	TOTAL	MG/L	12	.424166	.177197	.420948	.992413	.121517	1.28000	.100000	76/12/07	77/08/31
00620 NO3-N	TOTAL	MG/L	14	1.85214	.508445	.713053	.384989	.190571	3.47000	.970000	76/12/07	77/08/31
00625 TOT KJEL	N	MG/L	12	10.1500	14.4846	3.80586	.374962	1.09866	14.1000	3.60000	77/01/12	77/08/31
00665 PHOS-TOT		MG/L P	4	1.63750	.131891	.363168	.221782	.181584	2.00000	1.32000	76/12/07	77/08/31
00940 CHLORIDE	CL	MG/L	14	77.7786	859.303	29.3139	.376889	7.83446	116.000	40.0000	76/12/07	77/08/31
01002 ARSENIC	AS,TOT	UG/L	7	10.0000	.000000	.000000		.000000	10.0000	10.0000	76/12/07	77/08/31
01027 CADMIUM	CD,TOT	UG/L	7	2.71428	4.57144	2.13809	.787718	.808123	5.00000	1.00000	76/12/07	77/08/31
01042 COPPER	CU,TOT	UG/L	7	10.0000	.000000	.000000		.000000	10.0000	10.0000	76/12/07	77/08/31
01051 LEAD	PB,TOT	UG/L	7	34.2857	395.239	19.8806	.579851	7.51417	50.0000	10.0000	76/12/07	77/08/31
01092 ZINC	ZN,TOT	UG/L	7	15.0000	90.0000	9.48683	.632455	3.58569	35.0000	7.00000	76/12/07	77/08/31
31501 TOT COLI	MFIMENDO	/100ML	12	125940	.890E+11	298436	2.36967	86150.9	900000	40.0000	76/12/07	77/08/31
31616 FEC COLI	MFM-FCBR	/100ML	11	2383.64	.562E+08	7501.83	3.14722	2261.89	25000.0	10.0000	76/12/07	77/08/31
31679 FECSTREP	MF M-ENT	/100ML	10	122.000	35795.6	189.197	1.55080	59.8294	650.000	10.0000	76/12/07	77/08/31
50060 CHLORINE	TOT RESD	MG/L	6	.166667	.018667	.136626	.819756	.055777	.300000	.000000	77/04/19	77/08/31
70300 RESIDUE	DISS-180	C MG/L	4	571.500	12555.0	112.049	.196061	56.0245	672.000	473.000	76/12/07	77/08/31
70507 PHOS-T	ORTHO	MG/L P	4	1.11500	.007502	.086612	.077679	.043306	1.24000	1.04000	76/12/07	77/08/31
70900 INVALID	PAR	NUMBER	1	.500000					.500000	.500000	77/08/31	77/08/31
71900 MERCURY	HG,TOTAL	UG/L	3	3.50000	6.75000	2.59808	.742307	1.50000	5.00000	.500000	76/12/07	77/08/31

STORET RETRIEVAL DATE 79/05/05

2040100
43 36 10.0 116 35 15.0 5
INDIAN CRK. BELOW NAMPA STP
16027 IDAHO
PACIFIC NORTHWEST 130704
MIDDLE SNAKE RIVER BASIN
2110SURV 770203
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00061 STREAM FLOW, INST-CFS	00300 DO MG/L	00310 BOD 5 DAY MG/L	00335 COD LOWLEVEL MG/L	00340 COD HI LEVEL MG/L	00400 PH SU	00403 LAB PH SU	31501 TOT COLI MFIMENDO /100ML	31616 FEC COLI MFM-FCBR /100ML
76/12/07	11 00		12.0	50	6.5	9.0L	75.6		7.70		400	10K
	11 05		12.0	50	6.5	8.9L	71.3		7.70		560	1
77/01/12	12 00		10.0		6.0			134	7.40		900000	
	12 05		10.0		6.0			204	7.40		600600	25000
77/02/09	14 45		12.0	50J	6.2	43.0		110	7.60		5400	430
	15 00		12.0	50J	6.2	35.0		100	7.60			
77/03/08	10 30		12.0	50J	8.0	13.1	33.0		7.70	7.8	1000	100K
	11 00		12.0	50J	8.0	11.8	37.0		7.70	7.8	2600	10K
77/04/19	11 15		13.5	50J	7.8	4.6	29.0		7.60		40	6
	11 30		13.5	50J	7.8	4.7	25.0		7.60		70	2
77/05/25	10 00		15.5	70J	6.5	7.3	23.7		6.90		180	130
	10 15		15.5	70J	6.5	7.7	21.6		6.90		330	17
77/08/31	11 15		16.0		6.6	6.5	40.3		7.50		900	10
	11 30		16.0		6.6	7.8	37.8		7.50			

DATE FROM TO	TIME OF DAY	DEPTH FEET	31679 FECSTREP MF M-ENT /100ML	00610 NH3-N TOTAL MG/L	00615 NO2-N TOTAL MG/L	00620 NO3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00665 PHOS-TOT MG/L P	00669 PHOS-TOT HYDRO MG/L P	70507 PHOS-T ORTHO MG/L P	00070 TURB JKSN JTU	00095 CNDUCTVY AT 25C MICROMHO
76/12/07	11 00		100K	5.270	0.355	2.090		1.900		1.090	12.0	114
	11 05		10K	4.150	0.342	2.240		2.000		1.240	14.0	112
77/01/12	12 00			7.050	0.506	1.320	14.100				21.0	136
	12 05			7.030	0.480	1.830	13.100				21.0	1287
77/02/09	14 45		650	8.810	0.100	1.720	12.400				13.0	1016
	15 00			9.950	0.104	1.730	12.200				16.0	1073
77/03/08	10 30		100K	13.400	0.162	2.350	12.100				6.5	984
	11 00		100K	9.220	0.159	2.310	12.700				7.3	1018
77/04/19	11 15		10K	9.970		2.520	12.100				5.8	113
	11 30		30	10.100		3.470	12.300				5.2	1130
77/05/25	10 00		70	0.159	1.270	1.130	6.700				5.5	848
	10 15		50	3.030	1.280	1.460	6.700				7.2	848
77/08/31	11 15		100	1.330	0.167	0.870	3.600	1.320		1.090	3.6	78
	11 30				0.165	0.890	3.800	1.330		1.040	3.6	78

STORET RETRIEVAL DATE 79/05/05

/TYPA/AMBNT/STREAM

2040106
43 36 10.0 116 35 15.0 5
INDIAN CRK. BELOW NAMPA STP
16027 IDAHO
PACIFIC NORTHWEST 130704
MIDDLE SNAKE RIVER BASIN
21IDSURV 770203
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00530 RESIDUE TOT NFLT MG/L	70300 RESIDUE DISS-180 C MG/L	00410 T ALK CACO3 MG/L	00425 HCO3 ALK CACO3 MG/L	00430 CO3 ALK CACO3 MG/L	00940 CHLORIDE CL MG/L	50060 CHLORINE TOT RESD MG/L	01002 ARSENIC AS,TOT UG/L	01027 CADMIUM CD,TOT UG/L	01042 COPPER CU,TOT UG/L
76/12/07	11 00		48	672	376	348	28	97		10K	5K	1[illegible]
	11 05		66	665	338	326	12	97		10K	5K	10K
77/01/12	12 00		53		372	372	1K	116				
	12 05		44		372	372	1K	113				
77/02/09	14 45		31		356	356	1K	113		10K	5K	10
	15 00		40		345	345	1	103				
77/03/08	10 30		17		317	317	1K	54		10K	1K	10K
	11 00		20		319	319	1K	52		10K	1K	10K
77/04/19	11 15		18		319	319	1K	82	0.20			
	11 30		9		318	318	1K	85	0.20			
77/05/25	10 00		20		249	249	1K	49	0.00			
	10 15		27		251	251	1K	47	0.00			
77/08/31	11 15		5	476	241	241	1K	41	0.30	10K	1K	1[illegible]
	11 30		5	473	243	243	1K	40	0.30	10K	1K	10

DATE FROM TO	TIME OF DAY	DEPTH FEET	01051 LEAD PB,TOT UG/L	01092 ZINC ZN,TOT UG/L	71900 MERCURY HG,TOTAL UG/L	00042 ALTITUDE FEET AB MSL
01/01/01						2500
76/12/07	11 00		10	18	5.0K	
	11 05		20	35	5.0K	
77/02/09	14 45		10	14		
77/03/08	10 30		50K	10		
	11 00		50K	11		
77/08/31	11 15		50K	7	0.5K	
	11 30		50K	10		

STORET DATE 79/05/04

2040102
43 37 15.0 116 36 42.0 5
INDIAN CRK. MIDWAY ROAD
16027 IDAHO
PACIFIC NORTHWEST 130704
MIDDLE SNAKE RIVER BASIN
21IDSURV 770203
0000 CLASS 00

/TYPA/AMBNT/STREAM

INDEX 1310001 002740 06150 0220
MILES 0324.30 0391.30 019.70 007.00

PARAMETER				NUMBER	MEAN	VARIANCE	STAN DEV	COEF VAR	STAND ER	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT	8	13.4375	9.38839	3.06405	.228022	1.08330	17.0000	9.00000	76/12/07	77/08/31
00042	ALTITUDE	FEET	AB MSL	1	2500.00					2500.00	2500.00	01/01/01	01/01/01
00061	STREAM	FLOW,	INST-CFS	5	40.6200	514.772	22.6886	.558557	10.1466	53.0000	.100000	76/12/07	77/05/2[illegible]
00070	TURB	JKSN	JTU	8	6.23749	13.7140	3.70325	.593708	1.30929	14.0000	2.10000	76/12/07	77/08/31
00095	CNDUCTVY	AT 25C	MICROMHO	8	930.750	24885.1	157.750	.169487	55.7731	1259.00	780.000	76/12/07	77/08/31
00299	DO	PROBE	MG/L	1	6.80000					6.80000	6.80000	77/04/19	77/04/19
00300	DO		MG/L	7	4.50000	4.28003	2.06882	.459739	.781942	7.20000	.600000	76/12/07	77/08/31
00310	BOD	5 DAY	MG/L	7	7.55714	3.60624	1.89901	.251287	.717759	10.0000	4.50000	76/12/07	77/08/31
00335	COD	LOWLEVEL	MG/L	8	29.5500	194.977	13.9634	.472536	4.93681	51.0000	12.0000	76/12/07	77/08/31
00400	PH		SU	7	7.50000	.083415	.288816	.038509	.109162	7.80000	6.90000	76/12/07	77/08/31
00403	LAB	PH	SU	1	7.80000					7.80000	7.80000	77/03/08	77/03/08
00410	T ALK	CACO3	MG/L	8	272.375	1226.84	35.0263	.128596	12.3837	324.000	234.000	76/12/07	77/08/31
00425	HCO3 ALK	CACO3	MG/L	8	269.875	981.839	31.3343	.116107	11.0783	313.000	234.000	76/12/07	77/08/31
00430	CO3 ALK	CACO3	MG/L	8	3.37500	45.1250	6.71751	1.99037	2.37500	20.0000	1.00000	76/12/07	77/08/31
00530	RESIDUE	TOT NFLT	MG/L	8	20.6250	147.122	12.1294	.588093	4.28839	40.0000	4.70000	76/12/07	77/08/31
00610	NH3-N	TOTAL	MG/L	8	4.01637	5.60653	2.36781	.589540	.837147	7.05000	.797000	76/12/07	77/08/31
00615	NO2-N	TOTAL	MG/L	7	.613285	.354563	.595452	.970921	.225060	1.79000	.018000	76/12/07	77/08/31
00620	NO3-N	TOTAL	MG/L	8	1.64750	1.11116	1.05412	.639829	.372687	3.68000	.370000	76/12/07	77/08/31
00625	TOT KJEL	N	MG/L	7	6.73714	8.83504	2.97238	.441193	1.12345	10.7000	3.20000	77/01/12	77/08/31
00665	PHOS-TOT		MG/L P	3	1.24333	.066033	.256969	.206677	.148361	1.54000	1.09000	76/12/07	77/08/31
00940	CHLORIDE	CL	MG/L	8	65.4875	749.989	27.3859	.418186	9.68239	108.000	37.0000	76/12/07	77/08/31
01002	ARSENIC	AS,TOT	UG/L	3	10.0000	.000000	.000000		.000000	10.0000	10.0000	76/12/07	77/08/31
01027	CADMIUM	CD,TOT	UG/L	3	2.66667	4.33334	2.08167	.780626	1.20185	5.00000	1.00000	76/12/07	77/08/31
01042	COPPER	CU,TOT	UG/L	3	10.0000	.000000	.000000		.000000	10.0000	10.0000	76/12/07	77/08/31
01051	LEAD	PB,TOT	UG/L	3	36.6667	533.334	23.0940	.629838	13.3333	50.0000	10.0000	76/12/07	77/08/31
01092	ZINC	ZN,TOT	UG/L	3	6.33333	24.3334	4.93289	.778877	2.84800	12.0000	3.00000	76/12/07	77/08/31
31501	TOT COLI	MFIMENDO	/100ML	9	147611	.846E+11	290998	1.96871	96999.2	770000	1600.00	76/12/07	77/08/31
31616	FEC COLI	MFM-FCBR	/100ML	8	35400.0	.976E+10	98834.1	2.79193	34943.2	280000	100.000	76/12/07	77/08/31
31679	FECSTREP	MF M-ENT	/100ML	7	114.286	1428.58	37.7966	.330720	14.2858	200.000	100.000	76/12/07	77/08/31
70300	RESIDUE	DISS-180	C MG/L	3	509.000	8923.00	94.4616	.185583	54.5374	618.000	451.000	76/12/07	77/08/31
70507	PHOS-T	ORTHO	MG/L P	3	.978999	.006214	.078830	.080521	.045512	1.07000	.932000	76/12/07	77/08/31
71900	MERCURY	HG,TOTAL	UG/L	3	2.00000	6.75000	2.59808	1.29904	1.50000	5.00000	.500000	76/12/07	77/08/31

STORET RETRIEVAL DATE 79/05/05

2040102
43 37 15.0 116 36 42.0 5
INDIAN CRK.   MIDWAY ROAD
16027   IDAHO
PACIFIC NORTHWEST   130704
MIDDLE SNAKE RIVER BASIN
21IDSURV 770203
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00061 STREAM FLOW, INST-CFS	00300 DO MG/L	00310 BOD 5 DAY MG/L	00335 COD LOWLEVEL MG/L	00340 COD HI LEVEL MG/L	00400 PH SU	00403 LAB PH SU	31501 TOT COLI MFIMENDO /100ML	31616 FEC COLI MFM-FCBR /100ML
76/12/07	13 30		12.0	53	3.9	8.1L	51.0		7.60		7000	60
77/01/12	13 25		9.0		0.6		16.0				770000	
	13 30										530000	28000
77/02/09	10 00		10.0	50J	4.0	10.0	47.0		7.50		4500	140
77/03/08	11 30		13.0	50J	7.2	9.6	12.0		7.70	7.8	14000	10K
77/04/19	12 00		13.5	50J		6.5	23.0		7.60		1600	70
77/05/25	11 40		16.0	0.13	6.0	7.5	22.7		6.90		1300	10K
77/08/31	13 30		17.0		4.9	4.5	31.1		7.50		1200	10
	13 45		17.0		4.9	6.7	33.6		7.50		1000	20

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DATE FROM TO	TIME OF DAY	DEPTH FEET	31679 FECSTREP MF M-ENT /100ML	00610 NH3-N TOTAL MG/L	00615 NO2-N TOTAL MG/L	00620 NO3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00665 PHOS-TOT MG/L P	00669 PHOS-TOT HYDRO MG/L P	70507 PHOS-T ORTHO MG/L P	00070 TURB JKSN JTU	00095 CNDUCTVY AT 25C MICROMHO
76/12/07	13 30		100K	4.590	0.314	2.040		1.540		1.070	5.2	104
77/01/12	13 25			5.660	0.018	0.370	10.700				14.0	125
77/02/09	10 00		100	5.250	0.142	1.850	8.060				7.0	905
77/03/08	11 30		100K	7.050	0.884	2.060	9.600				6.8	93
77/04/19	12 00		100K	5.540		3.680	7.460				4.8	89
77/05/25	11 40		100K	2.440	1.790	1.700	4.600				7.4	848
77/08/31	13 30		100K	0.797	0.567	0.740	3.200	1.090		0.935	2.6	78
	13 45		200	0.804	0.578	0.740	3.600	1.100		0.932	2.1	78

STORET RETRIEVAL DATE 79/05/05

2040102
43 37 15.0 116 36 42.0 5
INDIAN CRK.   MIDWAY ROAD
16027   IDAHO
PACIFIC NORTHWEST   130704
MIDDLE SNAKE RIVER BASIN
21IDSURV 770203
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00530 RESIDUE TOT NFLT MG/L	70300 RESIDUE DISS-180 C MG/L	00410 T ALK CACO3 MG/L	00425 HCO3 ALK CACO3 MG/L	00430 CO3 ALK CACO3 MG/L	00940 CHLORIDE CL MG/L	50060 CHLORINE TOT RESD MG/L	01002 ARSENIC AS,TOT UG/L	01027 CADMIUM CD,TOT UG/L	01042 COPPER CU,TOT UG/L
76/12/07	13 30		13	618	324	304	20	91		10K	5K	10K
77/01/12	13 25		40		262	262	1K	108				
77/02/09	10 00		33		313	313	1K	89				
77/03/08	11 30		26		293	293	1K	51				
77/04/19	12 00		18		275	275	1K	66				
77/05/25	11 40		22		243	243	1K	44				
77/08/31	13 30		5	451	234	234	1K	37		10K	2	10K
	13 45		8	458	235	235	1K	38		10K	1	1[illegible]

DATE FROM TO	TIME OF DAY	DEPTH FEET	01051 LEAD PB,TOT UG/L	01092 ZINC ZN,TOT UG/L	71900 MERCURY HG,TOTAL UG/L	00042 ALTITUDE FEET AB MSL
01/01/01						2500
76/12/07	13 30		10K	12	5.0K	
77/08/31	13 30		50K	3	0.5K	
	13 45		50K	4	0.5K	

STORET DATE 79/05/04

2040106
43 40 30.0 116 42 10.0 5
INDIAN CRK. NEAR MOUTH
16027 IDAHO
PACIFIC NORTHWEST 130704
MIDDLE SNAKE RIVER BASIN
21IDSURV 770203
0000 CLASS 00

/TYPA/AMBNT/STREAM

INDEX 1310001 002740 06150 0220
MILES 0324.30 0391.30 019.70 000.10

PARAMETER			NUMBER	MEAN	VARIANCE	STAN DEV	COEF VAR	STAND ER	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010 WATER	TEMP	CENT	8	12.1250	12.1250	3.48210	.287183	1.23111	16.0000	8.00000	76/12/07	77/08/31
00061 STREAM	FLOW,	INST-CFS	4	125.750	9048.91	95.1258	.756467	47.5629	243.000	10.0000	76/12/07	77/08/31
00070 TURB	JKSN	JTU	6	9.58333	26.9778	5.19401	.541984	2.12045	15.0000	1.80000	76/12/07	77/05/25
00095 CNDUCTVY	AT 25C	MICROMHO	6	684.333	40229.8	200.574	.293093	81.8838	894.000	384.000	76/12/07	77/05/25
00300 DO		MG/L	8	8.88749	.581334	.762452	.085789	.269568	10.4000	8.00000	76/12/07	77/08/31
00310 BOD	5 DAY	MG/L	7	2.79999	6.34670	2.51927	.899740	.952194	6.90000	.500000	76/12/07	77/08/31
00335 COD	LOWLEVEL	MG/L	8	20.1625	382.791	19.5650	.970369	6.91729	68.0000	9.40000	76/12/07	77/08/31
00400 PH		SU	8	7.77500	.153530	.391828	.050396	.138532	8.20000	6.90000	76/12/07	77/08/31
00403 LAB	PH	SU	1	8.10000					8.10000	8.10000	77/03/08	77/03/08
00410 T ALK	CACO3	MG/L	8	214.250	3155.93	56.1777	.262206	19.8618	271.000	120.000	76/12/07	77/08/31
00425 HCO3 ALK	CACO3	MG/L	8	211.750	2921.64	54.0522	.255264	19.1103	271.000	120.000	76/12/07	77/08/31
00430 CO3 ALK	CACO3	MG/L	8	3.37500	45.1250	6.71751	1.99037	2.37500	20.0000	1.00000	76/12/07	77/08/31
00530 RESIDUE	TOT NFLT	MG/L	8	38.6250	365.982	19.1307	.495292	6.76371	70.0000	18.0000	76/12/07	77/08/31
00610 NH3-N	TOTAL	MG/L	5	.826000	.409880	.640219	.775083	.286314	1.81000	.190000	76/12/07	77/05/25
00615 NO2-N	TOTAL	MG/L	8	.161000	.014353	.119802	.744114	.042356	.439000	.066000	76/12/07	77/08/31
00620 NO3-N	TOTAL	MG/L	8	2.00375	.684254	.827197	.412825	.292458	2.97000	1.11000	76/12/07	77/08/31
00625 TOT KJEL	N	MG/L	7	1.87571	.849528	.921698	.491385	.348369	3.04000	.680000	77/01/12	77/08/31
00665 PHOS-TOT		MG/L P	3	.420000	.000100	.010023	.023865	.005787	.430000	.410000	76/12/07	77/08/31
00940 CHLORIDE	CL	MG/L	6	28.3833	157.122	12.5348	.441626	5.11732	44.0000	12.3000	76/12/07	77/05/25
01002 ARSENIC	AS,TOT	UG/L	3	10.0000	.000000	.000000		.000000	10.0000	10.0000	76/12/07	77/08/31
01027 CADMIUM	CD,TOT	UG/L	3	2.33333	5.33334	2.30940	.989744	1.33333	5.00000	1.00000	76/12/07	77/08/31
01042 COPPER	CU,TOT	UG/L	3	10.0000	.000000	.000000		.000000	10.0000	10.0000	76/12/07	77/08/31
01051 LEAD	PB,TOT	UG/L	3	36.6667	533.334	23.0940	.629838	13.3333	50.0000	10.0000	76/12/07	77/08/31
01092 ZINC	ZN,TOT	UG/L	3	6.66667	65.3334	8.08291	1.21244	4.66667	16.0000	2.00000	76/12/07	77/08/31
31501 TOT COLI	MFIMENDO	/100ML	8	23472.5	.145E+10	38207.4	1.62775	13508.4	90000.0	100.000	76/12/07	77/08/31
31616 FEC COLI	MFM-FCBR	/100ML	8	2227.50	.136E+08	3695.29	1.65894	1306.48	10600.0	100.000	76/12/07	77/08/31
31679 FECSTREP	MF M-ENT	/100ML	7	1087.14	6348490	2519.62	2.31765	952.327	6800.00	100.000	76/12/07	77/08/31
70300 RESIDUE	DISS-180	C MG/L	3	405.000	6781.00	82.3468	.203325	47.5429	500.000	354.000	76/12/07	77/08/31
70507 PHOS-T	ORTHO	MG/L P	3	.309333	.000056	.007507	.024269	.004334	.317000	.302000	76/12/07	77/08/31
71900 MERCURY	HG,TOTAL	UG/L	3	2.00000	6.75000	2.59808	1.29904	1.50000	5.00000	.500000	76/12/07	77/08/31

STORET RETRIEVAL DATE 79/05/05

/TYPA/AMBNT/STREAM

2040106
43 40 30.0 116 42 10.0 5
INDIAN CRK. NEAR MOUTH
16027 IDAHO
PACIFIC NORTHWEST 130704
MIDDLE SNAKE RIVER BASIN
21IDSURV 770203
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00061 STREAM FLOW, INST-CFS	00300 DO MG/L	00310 BOD 5 DAY MG/L	00335 COD LOWLEVEL MG/L	00340 COD HI LEVEL MG/L	00400 PH SU	00403 LAB PH SU	31501 TOT COLI MFIMENDO /100ML	31616 FEC COLI MFM-FCBR /100ML
76/12/07	15 50		11.0	243	8.1	6.9	14.7		8.00		3000	100K
77/01/12	15 30		8.0		8.0		68.0		7.90		80000	450
	15 35										90000	1060
77/02/09	09 00		8.0		9.2	1.2	13.0		7.80		1000	20[illegible]
77/03/08	12 30		10.0		9.2	5.7	9.4		8.00	8.1	10500	10.K
77/04/19	14 30		12.0	103	10.4	2.7	10.0		8.20		[illegible]60	30[illegible]
77/05/25	13 15		16.0		9.0	1.8	13.5		6.90		2300	150[illegible]
77/08/31	15 45		16.0	125	8.6	0.8	19.3		7.70		880	520
	16 00		16.0	125	8.6	0.5	13.4		7.70			

DATE FROM TO	TIME OF DAY	DEPTH FEET	31679 FECSTREP MF M-ENT /100ML	00610 NH3-N TOTAL MG/L	00615 NO2-N TOTAL MG/L	00620 NO3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00665 PHOS-TOT MG/L P	00669 PHOS-TOT HYDRO MG/L P	70507 PHOS-T ORTHO MG/L P	00070 TURB JKSN JTU	00095 CNDUCTVY AT 25C MICROMHO
76/12/07	15 50		100K	0.970	0.200	2.970		0.420		0.302	1.8	786
77/01/12	15 30			0.830	0.066	2.110	3.040				15.0	894
	15 35		6800									
77/02/09	09 00		100K		0.085	2.850	2.230				11.0	724
77/03/08	12 30		100	1.810	0.439	2.950	2.900				4.7	823
77/04/19	14 30		100	0.330	0.121	1.220	1.000				6.0	384
77/05/25	13 15		200	0.190	0.154	1.650	2.000				15.0	49[illegible]
77/08/31	15 45		210		0.124	1.110	0.660	0.430		0.317		
	16 00				0.099	1.170	1.280	0.410		0.309		

STORET RETRIEVAL DATE 79/05/05

2040106
43 40 30.0 116 42 10.0 5
INDIAN CRK. NEAR MOUTH
16027 IDAHO
PACIFIC NORTHWEST 130704
MIDDLE SNAKE RIVER BASIN
21IDSURV 770203
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00530 RESIDUE TOT NFLT MG/L	70300 RESIDUE DISS-180 C MG/L	00410 T ALK CACO3 MG/L	00425 HCO3 ALK CACO3 MG/L	00430 CO3 ALK CACO3 MG/L	00940 CHLORIDE CL MG/L	50060 CHLORINE TOT RESD MG/L	01002 ARSENIC AS,TOT UG/L	01027 CADMIUM CD,TOT UG/L	01042 COPPER CU,TOT UG/L
76/12/07	15 50		33	500	264	244	20	34		10K	5K	10K
77/01/12	15 30		53		271	271	1K	34				
77/02/09	09 00		70		260	260	1K	44				
77/03/08	12 30		42		253	253	1K	32				
77/04/19	14 30		18		120	120	1K	12				
77/05/25	13 15		53		159	159	1K	14				
77/08/31	15 45		21	361	195	195	1K			10K	1K	10
	16 00		19	354	192	192	1K			10K	1K	10K

DATE FROM TO	TIME OF DAY	DEPTH FEET	01051 LEAD PB,TOT UG/L	01092 ZINC ZN,TOT UG/L	71900 MERCURY HG,TOTAL UG/L	00042 ALTITUDE FEET AB MSL
76/12/07	15 50		10	16	5.0K	
77/08/31	15 45		50K	2	0.5K	
	16 00		50K	2	0.5K	

APPENDIX C

IDAHO WATER QUALITY STANDARDS AND APPROPRIATE CRITERIA

III. GENERAL REQUIREMENTS

A. Interstate Compacts, Court Decrees and Adjudicated Water Rights

It shall be the policy of the Board that the adoption of water quality standards and the enforcement of such standards is not intended to conflict with the apportionment of water to the State of Idaho through any of the interstate compacts or court decrees, or to interfere with the rights of Idaho appropriators in the utilization of the water appropriations which have been granted to them under the statutory procedure or to interfere with water quality criteria established by mutual agreement of the participants in interstate water pollution control enforcement procedures.

B. Waters of the State Protected

All waters of the State to be protected for appropriate beneficial use shall include all recreational use in and/or on the water surface and for preservation and propagation of desirable species of aquatic biota shall include all natural streams and lakes, reservoirs or impoundments on natural streams and other specified waterways unless excepted on the basis of existing irreparable conditions which preclude such uses. Man-made waterways, unless otherwise specified, shall be protected for the use for which the waterways were developed.

C. Highest and Best Practicable Treatment and Control Required

Notwithstanding the water quality standards contained herein, where a higher standard can be achieved, the highest and best practicable treatment and/or control of wastewaters, activities and flows shall be provided so as to maintain dissolved oxygen at the highest desirable levels and overall water quality as good as possible, and water temperatures, coliform bacteria concentrations, dissolved chemical substances, toxic materials, radioactivity, turbidities, color, odor and other deleterious factors at the lowest desirable levels. Such policy to apply not only to existing wastewater sources but to future wastewater sources as they may develop, and for such other streams not listed herein.

D. Antidegradation of State Waters

Waters whose existing quality is better than the established standards as of the date on which such standards become effective will be maintained at their existing high quality. These and other waters of Idaho will not be lowered in quality unless and until it has been affirmatively demonstrated to the Department and the Federal Environmental Protection Agency that such change is justifiable as a result of necessary economic or social development and will not interfere with or become injurious to any assigned uses made of, or presently possible in, such waters. This will require that any industrial, public or private project or development which would constitute a new source of water pollution or an increased source of water pollution to high quality waters will be required, as part of the initial project design, to provide the highest and best degree of wastewater treatment available under existing technology, and, since there are also Federal standards, these wastewater treatment requirements will be developed cooperatively.

IV. RESTRICTIONS ON THE DISCHARGE OF SEWAGE AND INDUSTRIAL WASTEWATERS AND HUMAN ACTIVITIES WHICH AFFECT WATER QUALITY IN THE WATERS OF THE STATE

A. No wastewaters shall be discharged and no activities shall be conducted in such a way that said wastewaters or activities either alone or in combination with other wastewaters or activities will violate or can reasonably be expected to violate the water quality standards contained herein.

B. It is noted that from time to time certain short-term activities which are deemed necessary to accommodate essential activities and protect the public interest may be authorized by the Department under such conditions as the Department may prescribe, even though such activities may result in a reduction of water quality below the standards contained herein.

V. MAINTENANCE OF STANDARDS OF QUALITY

A. The degree of sewage or wastewater treatment required to restore and maintain the standards of quality shall be determined in each instance by the Board and shall be based upon the following:

1. The uses which are or may likely be made of the receiving stream.

2. The size and nature of flow of the receiving stream.

3. The quantity and quality of the sewage or wastewater to be treated.

4. The presence or absence of other sources of water pollution on the same watershed.

B. The water quality standards are subject to revision (following public hearings and concurrence of the Administrator of the EPA) as technical data, surveillance programs, and technological advances make such revisions desirable. Further, public hearings for the purpose of reviewing water quality standards shall be initiated in accordance with Title 67, Chapter 52, Idaho Code.

C. Established water quality standards shall not be applicable in the receiving waters within the mixing zone of limited size adjacent to and/or surrounding a wastewater discharge outfall as defined by specific mixing zone boundaries. Aesthetic values of receiving waters shall be protected irrespective of mixing zone boundaries.

Receiving water quality outside the mixing zone will be maintained at water quality standards contained herein, or existing water quality levels, whichever is higher.

D. In the application of the use classification, the most stringent criterion of a multiple criteria shall apply.

E. Sample collection, preservation and analytical procedures to determine compliance with these standards shall conform to the procedures prescribed by the latest edition of Standard Methods For The Examination Of Water And Wastewater, and other superseding methods published by the Department following consultation with adjacent states, and the concurrence of the Environmental Protection Agency.

VI. WATER USE CLASSIFICATION

The designated use(s) for which the waters of the State are to be protected shall include, but not necessarily limited to domestic and industrial water supply, irrigation and stock watering, recreation and/or aesthetic qualities. (See appendix, USES TO BE PROTECTED.) Recreational waters are further divided into two classes: (1) primary contact, and (2) secondary contact. Primary contact recreational waters (Class A) are for uses where the human body may come in direct contact with the raw water to the point of complete submergence. The raw water may be accidently ingested and certain sensitive organs such as eyes, ears, nose, etc. may be exposed to the water. These waters may be used for swimming, water skiing, skin diving, support and propagation of fish, aquatic and semi-aquatic life, and other forms of wildlife.

Primary contact recreational waters are further divided into sub-classes A_1 and A_2. Class A_1 is restricted to lakes and impoundments in which exceptionally high water quality exists. Waters of all lakes and impoundments shall be class A_1 unless otherwise excepted. In the instances where a flowing stream is classified and subsequently becomes an impoundment, that impoundment shall carry the same classification as the flowing stream. Class A_2 includes the remainder of the primary contact recreational waters.

Secondary contact recreational waters (Class B) are for uses in which the raw water supply is suitable for support and propagation of fish and other aquatic and semi-aquatic life, and other forms of wildlife. These waters may be used for boating, wading and other activities where ingestion of the raw water is not probable.

Waters classified as excepted (Class E) are waters in which, due to natural and/or man-made cause, the quality is not compatible with recreational uses. These waters are protected for the use(s) specified. The numerical value of the various parameters for specific Water Quality Standards contained herein under Section VIII shall apply to all Class E waters unless an alternate value for a given parameter is specified in Section IX for the waters under consideration.

Natural tributaries to the stream reaches are classified as primary recreational waters, Class A_2, unless otherwise specified. Waterways defined as a point source in Section 502(14), Public Law 92-500, are a means of conveyance for waters with no use classification. Canals and other man-made waterways excluded as a point source are protected for agricultural uses and aesthetic qualities and may be protected for other uses when specified.

In the instance where a flowing stream is classified and subsequently becomes an impoundment, that impoundment shall carry the same classification as the flowing stream. The criteria established for the various use-classifications may be modified by the Administrator for limited periods when receiving waters fall below their assigned water quality standards due to natural causes or if, in the opinion of the Administrator, the protection of the overall interest and welfare of the public requires such a modification.

VII. GENERAL WATER QUALITY STANDARDS FOR WATERS OF THE STATE

The following general water quality standards will apply to waters of the State, both surface and underground, in addition to the water quality standards set forth for specifically classified waters. Waters of the State shall not contain:

A. Toxic chemicals of other than natural origin in concentrations found to be of public health significance or to adversely affect the use for which the waters have been classified.*

B. Deleterious substances of other than natural origin in concentrations that cause tainting of edible species of fish or tastes and odors to be imparted to drinking water supplies.

C. Radioactive materials or radioactivity other than of natural origin which

1. Exceed 1/3 of the values listed in Column 2, Table II, Appendix A, Idaho Radiation Control Regulations as adopted by the Board on May 9, 1973.

2. Exceed the concentrations specified in the 1962 U. S. Public Health Service Drinking Water Standards for waters used for domestic supplies.

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* Guides such as the Water Quality Criteria published by the State of California Water Quality Control Board (Second Edition, 1963) and more recent research papers will be used in evaluating the tolerances of the various toxic chemicals for the use indicated.

3. Have a demonstrable effect on aquatic life.

The concentration of radioactive materials in these waters shall be less than those required to meet the Radiation Protection Guides for maximum exposure of critical human organs recommended by the former Federal Radiation Council in the case of foodstuffs harvested from these waters for human consumption.

D. Floating or submerged matter not attributable to natural causes.

E. Excess nutrients of other than natural origin that cause visible slime growths or other nuisance aquatic growths.

F. Visible concentrations of oil, sludge deposits, scum, foam or other material that may adversely affect the use indicated.

G. Objectionable turbidity which can be traced to a man-made source.

VIII. SPECIFIC WATER QUALITY STANDARDS

No wastewaters shall be discharged and/or no activity shall be conducted in waters of the State which either alone or in combination with other wastewaters or activities will cause in waters of any specified reach, lake or impoundment, or in general surface waters of the State

A. The organism concentrations of the coliform group

1. In waters of lakes and impoundments (A_1), except the following, which are classified as A_2 waters:

American Falls Reservoir	R.M. 738.0 to R.M. 714.0
Lake Walcott	
Milner Lake	R.M. 675.0 to R.M. 640.0
Murtaugh Lake	R.M. 690.0 to R.M. 675.0
Crane Falls Reservoir	
C. J. Strike Reservoir	R.M. 514.0 to R.M. 492.0
Lake Lowell	
Brownlee Reservoir	R.M. 338.0 to R.M. 285.0
Oxbow Reservoir	R.M. 285.0 to R.M. 273.0
Hells Canyon Reservoir	R.M. 273.0 to R.M. 247.0

a. Total coliform concentrations where associated with a fecal source(s) to exceed a geometric mean of 50/100 ml., nor shall more than 20 percent of total samples during any 30-day period exceed 200/100 ml. (as determined by multiple-tube fermentation or membrane filter procedures and based on not less than 5 samples for any 30-day period).

b. Fecal coliform concentrations to exceed a geometric mean of 10/100 ml., nor shall more than 10 percent of total samples during any 30-day period exceed 20/100 ml,; or greater than 50/100 ml. for any single sample.

* Coliform criteria for shoreline waters shall conform with that of Class A_2 waters. Shoreline water waters shall be defined as the 100 feet of water surface as measured from the shoreline.

2. In waters protected for primary contact recreation (A_2)

   a. Total coliform concentrations where associated with a fecal source(s) to exceed a geometric mean of 240/100 ml., nor shall more than 20 percent of total samples during any 30-day period exceed 1000/100 ml. (as determined by multiple-tube fermentation or membrane filter procedures and based on not less than 5 samples for any 30-day period).

   b. Fecal coliform concentrations to exceed a geometric mean of 50/100 ml., nor shall more than 10 percent of total samples during any 30-day period exceed 200/100 ml.; or greater than 500/100 ml. for any single sample.

3. In waters protected for secondary contact recreation (B)

   a. Total coliform concentrations where associated with a fecal source(s) to exceed a geometric mean of 1000/100 ml., nor shall more than 20 percent of total samples during any 30-day period exceed 2400/100 ml. (as determined by multiple-tube fermentation or membrane filter procedures and based on not less than 5 samples for any 30-day period).

   b. Fecal coliform concentrations to exceed a geometric mean of 200/100 ml., nor shall more than 10 percent of total samples during any 30-day period exceed 400/100 ml.; or greater than 800/100 ml. for any single sample.

B. Dissolved Oxygen

The DO concentration to be less than 6 mg/l or 90 percent of saturation, whichever is greater.

1. The DO standard shall apply to all flowing waterways.

2. The DO standard shall apply to the waters of all natural lakes and reservoirs except as excluded below:

   a. In depths of water less than 100 feet in natural lakes or reservoirs, the bottom 20 percent of water depth shall be excluded from application of the DO standard. In water depths greater than 100 feet, the bottom 20 feet of water depth shall be excluded for application of the DO standard.

b. Waters below a thermocline in stratified lakes or impoundments shall be excluded from application of the DO standard.

c. No wastewaters shall be discharged and/or no activity shall be conducted in waters excluded by a. and b. above, which either alone or in combination with other wastewaters or activities will cause the DO concentration in these waters to be less than 4 mg/l.

3. Notwithstanding exclusion of a. and b. above, the DO standard shall always apply to the top two feet of any lake or reservoir.

C. Hydrogen Ion Concentration (pH)

The pH values to be outside the range of 6.5 to 9.0. The induced variations shall not be more than 0.5 pH units.

D. Temperature

1. Any measurable increase when water temperatures are 66°F or above, or more than 2°F increase other than from natural causes when water temperatures are 64°F or less (unless otherwise specified).

2. Any increase exceeding 0.5°F due to any single source, or 2°F due to all sources combined.

For purposes of determining compliance, a "measurable increase" means no more than 0.5°F rise in temperature of the receiving water as measured immediately outside of an established mixing zone. Where mixing zone boundaries have not been defined, cognizance will be given to the opportunity for admixture of wastewater with the receiving water.

3. Any measurable increase when water temperatures are 68°F or above, or more than 2°F increase other than from natural causes when the water temperatures are 66°F or less in the following waters:

a. The main stem of the Snake River from the Oregon-Idaho border (R.M. 407) to the interstate line at Lewiston, Idaho (R.M. 139).

b. The Spokane River from Coeur d'Alene Lake outlet to the Idaho-Washington border.

c. The Palouse River from Princeton to the Idaho-Washington border.

d. The Pend Oreille River from the Pend Oreille Lake outlet to the Idaho-Washington border.

E. Turbidity

The turbidity other than of natural origin to exceed 5 Jackson Turbidity Units (JTU). Whenever the receiving water is greater than 5 JTU, due to conditions other than those caused by man, then no discharge and/or activity either alone or in combination with other wastewater or activity shall cause an increase of more than 5 JTU.

F. Total Dissolved Gas

The total concentration of dissolved gas shall not exceed 110 percent of saturation at atmospheric pressure at the point of sample collection due to non-natural causes. (In compliance with this standard Paragraph C, Section III, General Requirements shall apply.)

IX. SPECIFIC WATER QUALITY STANDARDS FOR CLASS E WATERS

Specific water quality standards contained herein under Section VIII shall apply to all Class E waters except as enumerated in this Section.

A. No wastewater shall be discharged and/or no activity shall be conducted which either alone or in combination with other wastewaters will cause the organism concentration of the coliform group in waters of the South Fork Coeur d'Alene River, Mullan to Enaville, or Paradise Creek, upper reaches to State line.

1. The total coliform concentrations where associated with a fecal source(s) to exceed a geometric mean of 240/100 ml., nor shall more than 20 percent of total samples during any 30-day period exceed 1000/100 ml. (as determined by multiple-tube fermentation or membrane filter procedures and based on not less than 5 samples for any 30-day period); or greater than 2400/100 ml. for any single sample.

2. The fecal coliform concentrations to exceed a geometric mean of 50/100 ml., nor shall more than 10 percent of total samples during any 30-day period exceed 200/100 ml.; or greater than 500/100 ml. for any single sample.

B. No wastewaters shall be discharged and/or no activity shall be conducted which either alone or in combination with other wastewaters will cause the DO concentration to be less than 75 percent of saturation in waters of Paradise Creek, upper reaches to the State line.

The states are responsible for the monitoring of and reporting data for interstate streams which include most tributaries to the major rivers.

3. PARAMETRIC COVERAGE:

The parametric coverage for the stations in the NWQSS network is shown on Table 2. At the present time there is some discrepancy among the various agencies' parametric coverage; however, negotiations are presently underway to develop a uniform parameter package. Station parameters covered by this report include a selection of those constituents which are, 1. considered significant in ambient station analysis and/or, 2. collected at each NWQSS station in the river basin under consideration.

4. REGION 10 WATER QUALITY CRITERIA:

Parameter	Criteria Level/Units	Environmental Impact and Reference
Temperature	$20^{o}C$ ($68^{o}F$) MAX	To protect growth and migration routes of salmonids (Federal Water Pollution Control Administration (FWPCA), Water Quality Criteria, 1968).
Dissolved Oxygen	6 mg/l MIN 90% SAT MIN	For good growth and the general well-being of trout, salmon, and other species of cold water aquatic life, DO concentrations should not be below 6 mg/l (FWPCA, Water Quality Criteria, 1968). In addition, state water quality standards normally require 90% saturation for dissolved oxygen (Idaho and Oregon).
Dissolved Gas	110% SAT MAX	To prevent fish fatalities by "gas bubble disease", in which dissolved gases in their circulatory system come out of solution to form bubbles (emboli), which block the flow of blood through the capillary vessels (Environmental Protection Agency, Quality Criteria for Water, 1976).

Parameter	Criteria Level/Units	Environmental Impact and Reference
pH	6.5 MIN 8.5 MAX	The pH range of 5 to 9 is not directly lethal to fish. However, the toxicity of several common pollutants is markedly affected by pH changes within this range, and increasing acidity or alkalinity may make these poisons more toxic. Therefore, a pH range of 6.5 to 9.0 is desirable to protect freshwater aquatic life (EPA, <u>Quality Criteria for Water</u>, 1976). In primary contact recreation waters, the pH should be within the range of 6.5-8.3 (except when due to natural causes) to prevent the possibilities of eye irritations in humans (FWPCA, <u>Water Quality Criteria</u>, 1968). State pH standards range from 6.5 to 9.0 for Idaho and 6.5 to 8.5 for Oregon and Washington. In light of the above information, our criteria has been set at 6.5 to 8.5.
Turbidity	25 JTU MAX	Most state standards have a turbidity standard of "not to exceed 5 JTU over background or natural conditions". This is rather ambiguous as to what "background or natural conditions" are. Also, this type of standard does not relate to the fishable/swimmable concept. Excessive turbidity reduces photosynthesis by aquatic plant life and damages the spawning grounds of fish and habitat of aquatic invertebrates. Buck (1956) observed that maximum production in hatchery ponds and reservoirs occurred where the average turbidity was less than 25 JTU (FWPCA, <u>Water Quality Criteria</u>, 1968).

Parameter	Criteria Level/Units	Environmental Impact and Reference
Phosphorus	Total 0.05 mg/l-P Total 0.15 mg/l-PO_4 Ortho 0.025 mg/l-P Ortho 0.075 mg/l-PO_4 Diss. Ortho 0.01 mg/l-P	Limited studies made to date indicate that different species of algae have somewhat different phosphorus requirements, with the range of available phosphorus usually falling between 0.01 and 0.05 mg/l as P. At these levels, when other conditions are favorable, blooms may be expected. While there is no set relationship between total and available phosphorus (because the ratio varies with season, temperature, and plant growth), the total phosphorus is governing, as the reservoir supplies the available phosphorus. A desirable guideline for total phosphorus is 0.05 mg/l as P where streams enter lakes or reservoirs (FWPCA, Water Quality Criteria, 1968). The other criteria levels for different units and forms of phosphorus have been determined by unit conversion and relationships found between the phosphorus forms in Region 10. The other forms of phosphorus are used only as indicators when data for total phosphorus is lacking.
Nitrate Nitrogen	0.30 mg/l-N 1.33 mg/l-NO_3	Mackenthum (1965) cited results indicating that inorganic nitrogen at 0.30 mg/l and inorganic phosphorus at 0.01 mg/l, at the start of an active growing season, subsequently permitted algal blooms (FWPCA, Water Quality Criteria, 1968).
Ammonia Nitrogen	Unionized 0.02 mg/l-N Total 0.20 mg/l-N Total 0.26 mg/l-NH_4	The amount of unionized ammonia is very much dependent upon pH, temperature, and concentration of total ammonia. A maximum level of 0.02 mg/l as unionized ammonia is recommended to minimize toxicity to freshwater aquatic life (EPA, Quality Criteria for Water, 1976). Concentrations of total ammonia above 0.20 mg/l as N are indicative of organic pollution (Klein, River Pollution 1., Chemical Analysis, 1959).

Parameter	Criteria Level/Units	Environmental Impact and Reference
Bacteria	Total Coliform 1000/100 ml Fecal Coliform 240/100 ml	Total and fecal coliform are microbiological indicators used to determine or indicate the safety of water for drinking, swimming, and shellfish harvesting. A fecal coliform log mean of 200 per 100 ml for bathing waters and 14 per 100 ml for shellfish harvesting waters is recommended by Quality Criteria for Water, EPA, 1976. State standards range from 240 total/50 fecal per 100 ml for primary contact recreation in Idaho, 1000 total per 100 ml in Oregon for general beneficial use, and 1000 total per 100 ml in Washington for Class B general recreation. From the above discussion, the suggested criteria level based on general recreation is 1000 per 100 ml for total coliform and 240 per 100 ml for fecal coliform.
Dissolved Solids Conductivity	TDS 500 mg/l Cond. 750 umho/cm	High levels of dissolved solids are a hazard for irrigation water. A maximum level of 500 mg/l is indicated for water from which no detrimental effects will usually be noticed. For domestic water supply, the maximum level is 250 mg/l (EPA, Quality Criteria for Water, 1976). A relationship exists between dissolved solids and conductivity where total dissolved solids = .6 to .8 times the conductivity.
Boron	750 ug/l	For long term irrigation, a maximum level of 750 ug/l is recommended for sensitive crops (EPA, Quality Criteria for Water, 1976).

Parameter	Criteria Level/Units	Environmental Impact and Reference
Benthic Inver- tebrate Biomass	--	Is a measure of the standing crops of the benthic fauna. Typical responses of the standing crop to environmental stress are: **Stress** — **Standing Crop Response** Toxic Substance — Reduce Severe Temperature Alterations — Variable Silt — Reduce Inorganic Nutrients — Increase Organic Nutrients (high O_2 demand) — Increase (EPA Biological Field and Laboratory Methods, 1973.)
Chlorophyll a	3 mg/l 3-20 mg/l 20 mg/l	Oligotrophic Mesotrophic Eutrophic (Vollenweider, Dr. R.A., Water Management Research, Scientific Fundamentals of the Eutrophication of Lakes and Flowing Waters with Particular Reference to Nitrogen and Phosphorus as Factors in Eutrophication, DAS/CSI/68.27).
Species Diversity	<1 polluted 1-3 moderate pollution >3 unpolluted	The species diversity index reflects the response of the benthic macroinvertebrate community to pollutional stress (Wilhelm 1970).

Heavy Metals Toxicity

Metal	Criteria Level	Environmental Impact	Reference
Cadmium	30 ug/l	Aquatic life protected in hard water	1
	3 ug/l	Eggs and larvae of salmon in hard water	
Chromium	50 ug/l	Mixed aquatic populations protected	1
Copper	20 ug/l	96 hour TL_{50} to Chinook salmon in soft water was 31 ug/l at hatch and 18 ug/l at 1 month old	2
Lead	30 ug/l	Aquatic life protected	1
Mercury	0.2 ug/l	Selected species of fish and predatory aquatic organisms protected	1
Zinc	100 ug/l	96 hour TL_{50} to Chinook salmon in soft water at 1 month old	2
	80 ug/l	Algalcidal concentration for Selenastrum Capriconutum	3

References:

1. EPA R3.73.033, Ecological Research Series, Water Quality Criteria 1972, U.S. Government Printing Office, 1973.
2. EPA, Quality Criteria for Water, 1976.
3. Green, et. al., Report to Region X on the Results of the Spokane River Algal Assays, 1973.
4. Wilhelm, J.L. 1970. "Range of Diversity Index in Benthic Macroinvertebrate Populations" JWPCF, 42(S); R221-R224.

Pesticide Toxicity

The following criteria levels are recommended to protect the freshwater aquatic life (EPA, *Quality Criteria for Water*, 1976).

Pesticide	Criteria Level
Aldrin	.003 ug/l
Dieldrin	.003 ug/l
Chlordane	.010 ug/l
DDT	.001 ug/l
Endrin	.004 ug/l
Heptachlor	.001 ug/l
Lindane	.010 ug/l
Malathion	.100 ug/l
Parathion	.040 ug/l