# POCATELLO STORM DRAIN STUDY

## Bannock County

**Data Collected 1979**

**Final Summary October 1980**

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

**Water Quality Summary**
**No. 24**

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## SURVEY SUMMARY

The City of Pocatello storm drains were sampled during a winter snowmelt period and during a summer rainstorm. Chemical analyses of the drain water indicated levels of suspended solids, total solids, Chemical Oxygen Demand, sodium, potassium, chloride, fluoride, arsenic, cadmium, hexavalent chromium, copper, iron, lead, manganese, and zinc higher than any of the three major NPDES discharges to the Portneuf River. Data results indicate storm drains are a major contributor of pollutants to the Portneuf River especially during summer rainstorms when the majority of the river flow is diverted for irrigation uses.

## I. INTRODUCTION

### Purpose:

The study was conducted to determine concentration levels of selected chemical parameters in the storm drain effluents and to develop water quality data on nonpoint sources in the Pocatello urban area.

### Background-Drainage Description:

The City of Pocatello is located in Bannock County, Idaho, at Latitude 42°52'20", Longitude 112°28'05", on the banks of the Portneuf River between River Miles 16.8 and 18.3. Drainage area of the Portneuf River at Pocatello is 1,250 square miles. Altitude is 4,448 feet. Average annual precipitation is about 10.8 inches per year. Total precipitation for 1979 was 8.8 inches.

## II. MATERIALS AND METHODS

All samples were obtained by the grab method. Samples were preserved according to Standard Method techniques. Laboratory analyses were performed according to Standard Methods. All samples were taken from the drains at the point of entry to the river.

Four stations were sampled in February and one in June during a storm event. The location of the stations is shown in Figure 1.

## III. RESULTS AND DISCUSSION

The June 18th rainstorm produced 0.43 inches of precipitation. The sampling was conducted during the peak period of flow from the

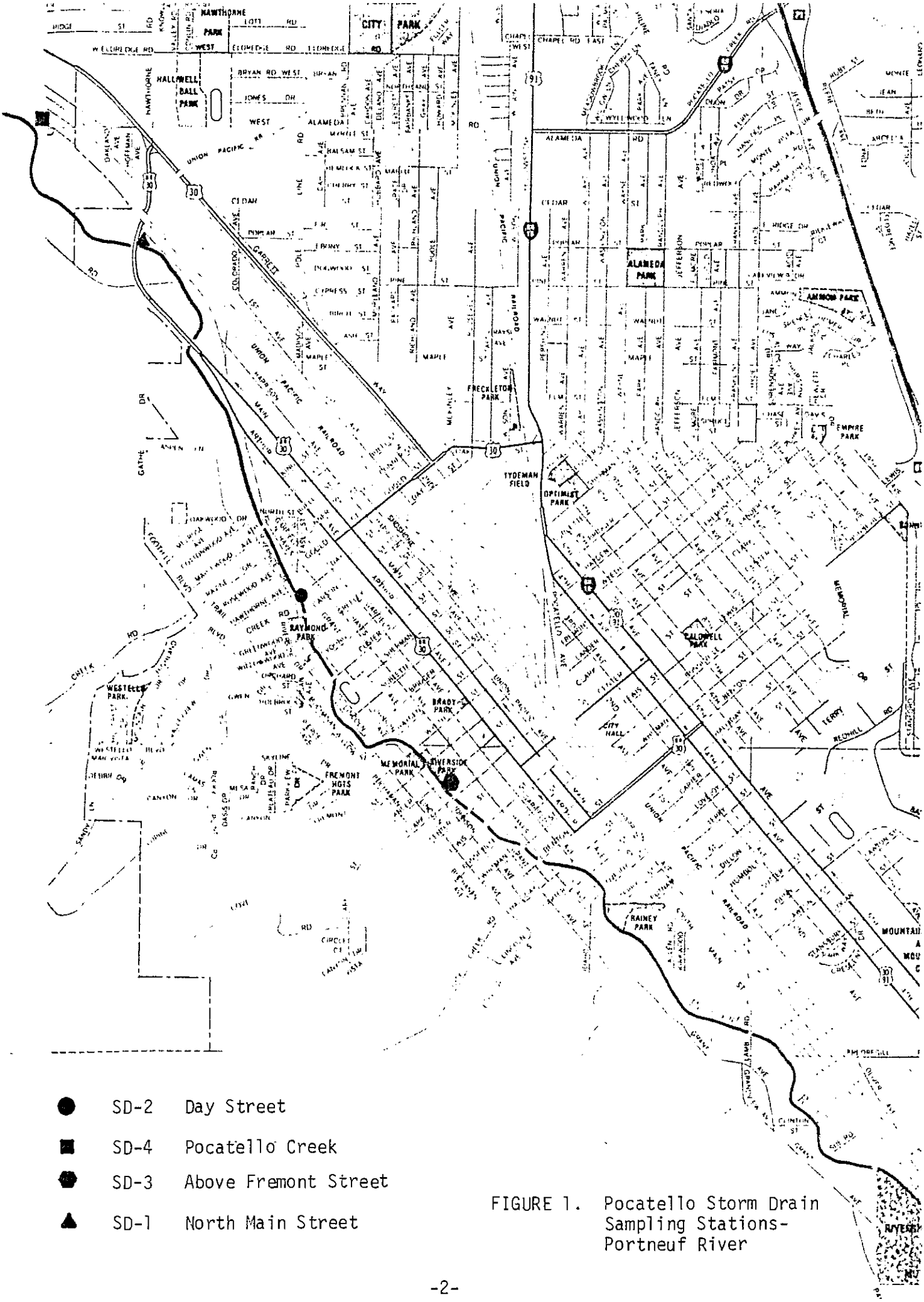


FIGURE 1. Pocatello Storm Drain Sampling Stations-Portneuf River

storm drains. The February samples were taken the day after the snowmelt runoff had peaked.

Heavy metal concentrations were higher in the summer rainstorm because sampling was done during the peak of the storm instead of the next day. Heavy metals apparently accumulate in the drains between storms. Copper, iron, lead, and zinc exceed water quality criteria (EPA, 1976) for freshwater aquatic life.

Pocatello's topography coupled with urban and suburban development account for the high levels of solids. Highest levels were recorded during the summer thundershowers. Pocatello Creek (SD-4) had the lowest concentrations of solids because the solids settle out in the stream bed while the steel culverts are designed to wash everything through. The suspended solids include or carry with them organic matter, nutrients, and the metals as can be seen from Table 1.

Sodium and chloride levels were highest during the winter sampling period due to salt application to city streets. (Table 1)

## IV. CONCLUSIONS

The impact of the effluents of the City of Pocatello storm drains on the water quality of the lower Portneuf River is unknown but has the potential to be larger than all combined point sources.

Summer rainstorms would have a large effect on the river due to the combination of low water levels in the stream and the amount of pollutants discharged to it in a relatively short time span.

Table 1. Chemical concentrations in Storm Drain Water to Portneuf River on February 12, 1979 and June 18, 1979. All parameters are expressed as mg/L except as noted otherwise.

| | STATIONS | | | | |
|---|---|---|---|---|---|
| | SD-2 Day St. | SD-1 Main St. | SD-2 Day St. | SD-3 Ab. Fremont St. | SD-4 Pocatello Cr. |
| | DATES | | | | |
| Parameter | 6-18 | 2-12 | 2-12 | 2-12 | 2-12 |
| COD | 251 | 93.7 | 136 | 175 | 50.0 |
| T Ammonia (N) | - | .142 | .107 | 5.83 | .147 |
| T Nitrite (N) | .148 | .006 | .044 | .004 | .082 |
| T Nitrate (N) | .11 | 2.36 | 2.31 | .93 | 3.43 |
| TKN (N) | 6.16 | 2.38 | 4.68 | 5.68 | 3.88 |
| T Phosphorus (P) | 4.35 | 1.01 | .96 | 2.11 | .55 |
| Ortho Phosphate (P) | .40 | .941 | .956 | .944 | .505 |
| Sp. Conductance (umhos/cm) | 202 | 1160 | 659 | 824 | 659 |
| Hardness | 148 | 200 | 140 | 136 | 180 |
| T. Alkalinity | 134 | 114 | 174 | 112 | 177 |
| Calcium | 46 | 48.0 | 46 | 43 | 50 |
| Sodium | 4.8 | 149.5 | 60 | 99.0 | 49.1 |
| Potassium | 8.0 | 9.2 | 11.8 | 11.8 | 13.2 |
| Chloride | 8.2 | 220 | 98 | 154 | 86 |
| Fluoride | 1.33 | 2.76 | 2.91 | 2.59 | 1.09 |
| Sulphate | <10 | 29 | 19 | 23 | 36 |
| Total Solids | 1510 | 822 | 1226 | 713 | 578 |
| Suspended Solids | 1190 | 288 | 968 | 408 | 226 |
| Heavy Metals (ug/L) | | | | | |
| Diss. Arsenic | <10 | <10 | <10 | <10 | <10 |
| Diss. Cadmium | <1 | <1 | <1 | <1 | <1 |
| Diss. Chromium | <50 | <50 | <50 | <50 | <50 |
| Diss. Copper | <10 | 20 | 20 | 10 | 10 |
| Diss. Iron | 30 | 90 | 90 | 60 | 70 |
| Diss. Lead | <50 | <50 | <50 | <50 | <50 |
| Diss. Manganese | 20 | 60 | 70 | 70 | 40 |
| Diss. Mercury | <.5 | <.5 | <.5 | <.5 | <.5 |
| Diss. Zinc | 5 | 33 | 28 | 38 | 15 |
| Total Arsenic | 17 | <10 | <10 | <10 | <10 |
| Total Cadmium | 12 | 5.3 | 6.5 | 4.0 | 1.5 |
| Chromium, +6 | 35 | <50 | <50 | <50 | <50 |
| Total Copper | 70 | 30 | 30 | 20 | 10 |
| Total Iron | 8350 | 3570 | 5420 | 3830 | 2450 |
| Total Lead | 1690 | 560 | 810 | 710 | 120 |
| Total Manganese | 730 | 230 | 600 | 280 | 210 |
| Total Mercury | <.5 | <.5 | <.5 | <.5 | <.5 |
| Total Zinc | 12 | 265 | 332 | 311 | 95 |

Urban perturbations such as road salt and concentrated developments in highly erodable areas contribute the major portion of the pollutants found with this study.

## V. RECOMMENDATIONS

A study should be undertaken to determine the impacts of the storm drains on the river and compare that to other known nonpoint source and point source problems.

The City of Pocatello should undertake steps through proper planning and zoning to minimize the erosion of top soil from steep sloped developed areas.

## LITERATURE

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