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Region 10
1200 Sixth Ave.
Seattle, WA 98101

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Water

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EPA

Draft Environmental Impact Statement

Wastewater Treatment Facilities for the City of Coeur d'Alene, Idaho

Draft
Environmental Impact Statement

City of Coeur d'Alene
Wastewater Facilities Plan

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December 10, 1980
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EXECUTIVE SUMMARY

(X) Draft Environmental Impact Statement

( ) Final Environmental Impact Statement

Type of Action: Administrative

Purpose and Need for Action

The City of Coeur d'Alene has applied to the U. S. Environmental Protection Agency (EPA*) for Section 201 (Clean Water Act) funds for upgrading the city's sewage treatment facilities. Wastewater treatment improvements are needed to comply with the city's National Pollutant Discharge Elimination System (NPDES) permit effluent quality requirements. Coeur d'Alene's sewage treatment plant is near capacity and is in a generally deteriorated condition, periodically failing to meet NPDES limits on suspended solids. EPA has awarded Section 201 Step 1 funds to the city to develop a facilities plan for needed improvements to the treatment plant. The upgraded facilities would improve effluent quality and expand service to city residents and residents of adjacent urbanizing unincorporated areas.

Protection of the Rathdrum Prairie aquifer, which lies beneath Coeur d'Alene, is also a concern. The aquifer is of high quality and serves as the drinking water supply for over 330,000 people who live in the Spokane River basin. Because of the aquifer's value as a domestic water supply, EPA designated it as "sole source" under the Federal Safe Drinking Water Act (SDWA) in 1978. The Idaho Panhandle Health District (PHD) has been given responsibility for the preservation of this valuable water source. Improvements in Coeur d'Alene's wastewater treatment system will comply with the PHD's aquifer protection policies and will provide capacity to eliminate a large number of septic tank wastewater treatment systems over the aquifer.

Before additional Section 201 funds for design (Step 2) and construction (Step 3) of a selected project can be awarded to the city, EPA must complete an environmental review of potential impacts of the proposed project. This review must meet the requirements of the National Environmental Policy Act (NEPA). In addition, the SDWA requires that federal agencies ensure that any action taken does not lead, directly

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*A list of abbreviations and acronyms is found on page 131.

or indirectly, to contamination that would create a significant health hazard in a "sole source" aquifer. EPA has prepared this Environmental Impact Statement (EIS) to comply with these requirements by evaluating the consequences of the construction of the city's proposed wastewater treatment facilities.

Project Alternatives

Background

The City of Coeur d'Alene is a community of approximately 20,000 people, located in Kootenai County in the Idaho Panhandle. It is 280 miles north of Boise, the state capital, 26 miles east of Spokane, Washington, and 90 miles south of the United States/Canadian border. The city lies on the northern shore of Lake Coeur d'Alene, where the Spokane River flows out of the lake and onto the Rathdrum Prairie. Terrain to the east and south is mountainous, but the prairie to the north and west is open and gently rolling agricultural land (Figure 1).

Coeur d'Alene, like much of northern Idaho, has experienced a rapid population increase in the last 5-10 years. It has grown from 16,228 in 1970 to over 20,000 according to preliminary 1980 census figures. This rapid growth has placed a heavy burden on local public services, including schools, water supply, and wastewater treatment. The existing city wastewater treatment plant occasionally experiences hydraulic overloads. This has resulted in restrictions on sewer system expansion and hookups imposed by the Idaho Department of Health and Welfare. The use of on-site waste disposal systems is still common in Coeur d'Alene, and is the principal wastewater treatment technique in surrounding unincorporated areas. The city's facilities planning consultant, Brown and Caldwell (1980), estimates that there are 10,000 residents using on-site systems within the facilities planning area. The continued use of these systems is of concern because of the unusual geologic and hydrologic character of the Rathdrum Prairie, on which Coeur d'Alene lies.

The Rathdrum Prairie is part of a glaciofluvial outwash plain that stretches from Lake Pend Oreille on the north to Spokane, Washington on the west. This 350-square-mile plain is underlain by a large underground body of fresh water known as the Rathdrum Prairie aquifer in Idaho and the Spokane Valley aquifer in Washington. Water flows south and then west through the coarse aquifer material, eventually surfacing as springs and surface flow near the junction of the Spokane and Little Spokane Rivers, 6 miles west of Spokane.

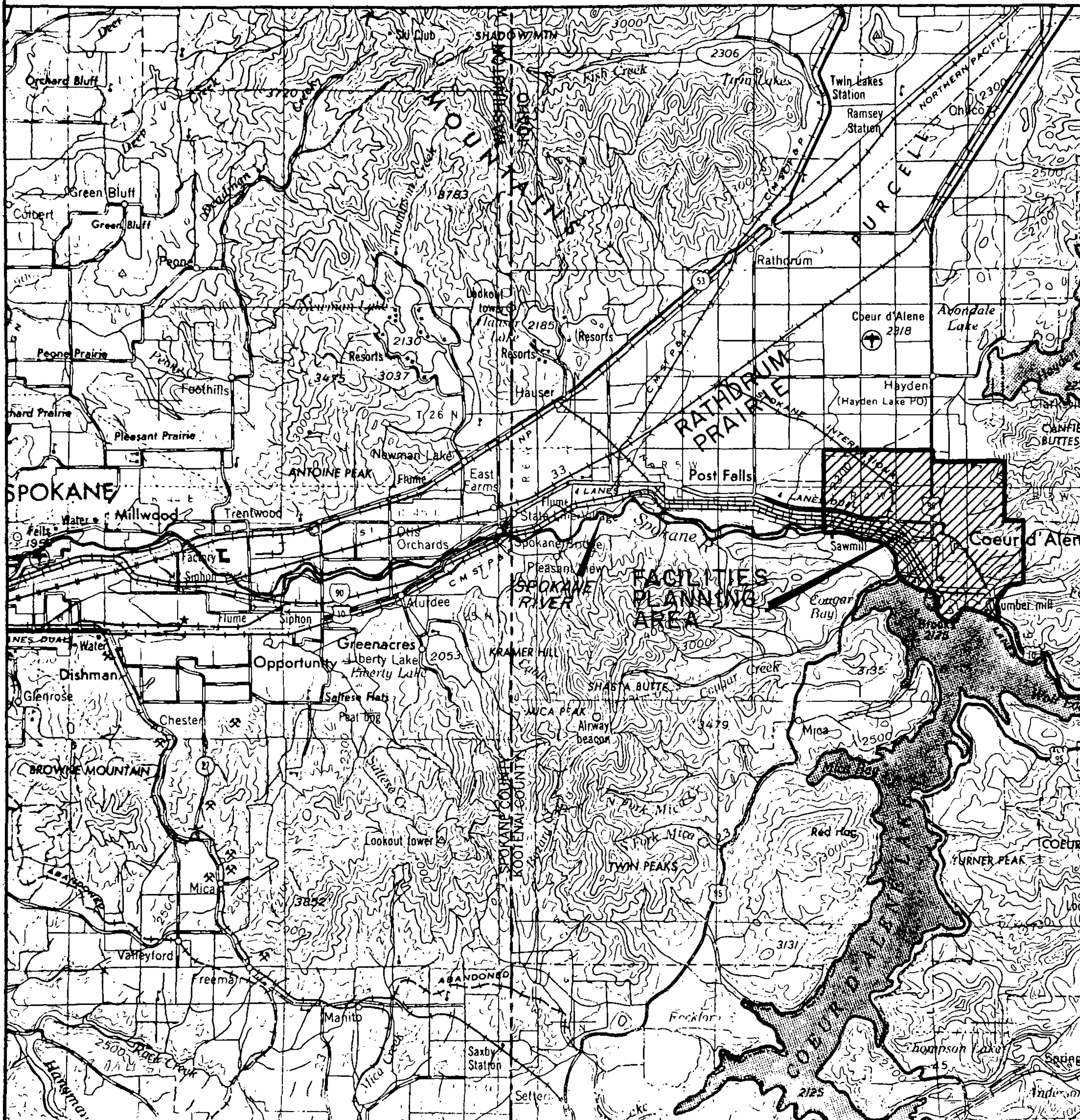

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FIGURE 1. REGIONAL SETTING

Because of the aquifer's value as a drinking water source and its designation by EPA as a "sole source" domestic water supply for the Spokane Valley, there have been numerous studies to describe its physical character, monitor its water quality, and develop strategies to protect it from degradation. Water quality management plans, financed under Section 208 of the federal Clean Water Act in both Idaho and Washington (Panhandle Area Council, 1978; Spokane County Office of County Engineer, 1979), are the principal policy-development documents being used to implement aquifer protection. Both studies indicated septic tank waste disposal systems used over the aquifer were contributing to deterioration of groundwater quality.

To rectify this situation, the State of Idaho empowered the PHD to develop regulations and policies to control the proliferation of on-site disposal systems and encourage the sewering of residences already using on-site systems. The PHD established a sewer management plan (SMP) agreement with Coeur d'Alene in May 1979. As part of this agreement, Coeur d'Alene was to develop and implement plans to provide improved wastewater service to residents within the SMP boundaries. Improved wastewater facilities would also provide capacity for expected population increases. The facilities plan analyzed in this EIS was prepared to meet the terms of this agreement and to comply with water quality goals of the Clean Water Act.

No Action

Federal regulations (40 CFR, Part 6) require that all EISs consider the impacts of continued use of the wastewater treatment and disposal methods currently serving area residents. This is the "no-action" alternative. For Coeur d'Alene, this would mean that the existing wastewater facilities would continue to operate as is, with occasional hydraulic overloads and violations of NPDES suspended solids limits. No state, federal or local funds would be allocated to design and construction of new facilities. Most of the approximately 10,000 Coeur d'Alene area residents now using septic tanks would continue to do so and wastewater contamination of the aquifer would continue. The city would be unable to extend central wastewater service to new residential, commercial or industrial development.

Alternative B

Alternative B is a plan to upgrade existing city wastewater facilities and construct additional facilities on 8 acres of vacant land immediately east of the present plant site. Activated sludge treatment would be added to the present trickling filter system and plant capacity would be increased from 2.5 to 4.2 million gallons per day (MGD) in 1985. In

1995, the capacity would again be increased to 6.0 MGD. A wasteload allocations study is being done on the Spokane River by the State of Washington, Department of Ecology. If the study indicates that phosphorus should be removed from the effluent, approximately 85 percent of the influent phosphorus load would be removed between May and October. Effluent would be discharged throughout the year to the Spokane River. Sludge would be dewatered mechanically and trucked to a site near the city landfill. Figure 2 diagrams this alternative.

Alternative E

Alternative E proposes closure of the existing treatment plant and construction of a new trickling filter/activated sludge plant 1-2 miles downstream on the north bank of the Spokane River. The new plant would occupy one of three possible 12-acre sites and would have an initial capacity of 4.2 MGD; as in Alternative B, capacity would be expanded to 6.0 MGD in 1995. All city wastewater would be pumped to this site and discharged to the river after treatment. As with Alternative B, phosphorus removal would occur between May and October (see Figure 2). Sludge also would be handled as in Alternative B or would be incinerated in a proposed wastewood-fired power plant on adjacent property.

Alternative G

Two treatment plants would be used in Alternative G. The existing plant would be upgraded but not expanded and would continue to serve the southern portion of the city. Phosphorus removal would be added to the treatment process, if necessary, but the capacity of the plant would remain about 2.2 MGD. River discharge of the effluent would continue.

The second treatment facility would be a series of aerated lagoons located 1-2 miles north of Coeur d'Alene. Wastewater from the northern part of town would be pumped to the lagoon system for biological secondary treatment. Initial capacity would be 2.0 MGD but would be expanded eventually to 3.8 MGD. During November-April, treated effluent would be piped to the Spokane River for discharge near Atlas. No phosphorus removal would be involved. From May-October, effluent would be treated and sprinkler irrigated on a grass seed or alfalfa crop (see Figure 2). Sludge disposal from the downtown plant site would occur as described for Alternative B. Sludge would accumulate on the bottom of the ponds and would be dried and scraped out once every 5 or 6 years. Disposal would then occur as in Alternative B.

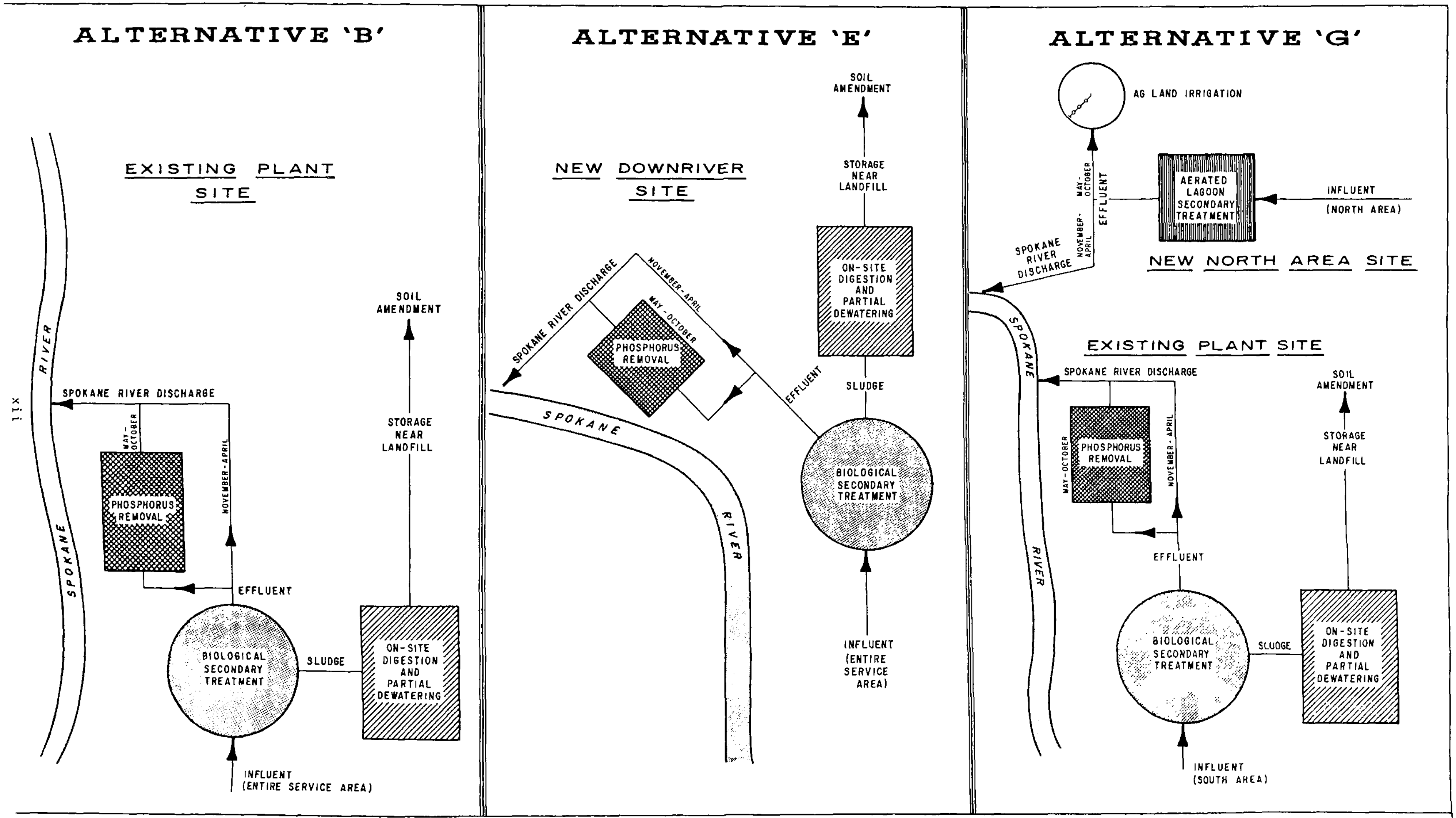


FIGURE 2. SCHEMATIC DIAGRAMS OF THE PROJECT ALTERNATIVES

Sewer System Extensions

A number of sewer interceptor extensions also are being planned. These would occur regardless of the treatment alternative selected. Extensions have been divided into short- and long-term projects, with the short-term aimed at sewering areas now using septic tanks. Most of the new lines would be in the northern section of town. These would be financed entirely with local funds, probably through formation of local improvement districts (LIDs).

Other Alternatives Considered

A number of other wastewater system alternatives were considered in the early planning stages but were dropped for a variety of economic and engineering reasons. There were originally six basic strategies plus "no-action". The action strategies each had four suboptions. Three alternatives that were dropped included a split plant concept (Alternative C), two plants on the river (Alternative D), and regionalization with Post Falls (Alternative F).

Facilities plan engineers eliminated these options with the aid of a local Citizens Advisory Committee. Alternative C was dropped because the split plant would be too costly to construct and would pose operation and maintenance problems. Alternative D was eliminated because of the high cost of operating and maintaining two separate treatment facilities. The regionalization option (Alternative F) was given detailed analysis but was dropped because of the high cost of conveying Coeur d'Alene's wastewater to the Post Falls area, and because the interlocal coordination and necessary agreements were judged to be a potentially delaying factor. EPA had requested that this option be given serious consideration due to the proximity of the two cities, the close timing of their facilities planning efforts, and the similarity of their concerns for water quality in the Rathdrum Prairie aquifer and the Spokane River.

Alternatives Available to EPA

EPA's principal roles in this project are to provide an environmental review and to administer design and construction funds available through Section 201 of the Clean Water Act. EPA has a number of options available in acting on the grant applicant's (Coeur d'Alene) request for federal funding of the wastewater project. In terms of the structural configuration of treatment and disposal processes, EPA could offer funds for a combination of processes not currently included in a single alternative in the facilities plan. Although this is unlikely, it could be done for environmental or economic reasons. In terms of administrative actions, after review of the facilities plan and the environmental impacts of construction of the proposed project, EPA could: 1) fund the project as described and recommended by the city, 2) not fund the project, 3) provide funding at a level below that requested by the city, 4) provide funding in excess of the level requested by the city, 5) fund the project in stages, or 6) fund the project only after attaching certain conditions to the grant award. These administrative actions would be in response to regulatory requirements, funding availability, environmental concerns or some combination of all three.

If EPA determines that the project selected by the City of Coeur d'Alene was excessive in cost or would result in adverse environmental impacts which could be mitigated, it may wish to remedy these problems by placing conditions on the award of subsequent grants rather than supporting a different alternative or modifying the funding. EPA administrative procedures allow this mitigation approach and place the burden of action on the grant applicant. Grant conditions can include specific monitoring requirements, requests for supporting ordinances, or a variety of other controls on the construction and operation of wastewater treatment and disposal facilities.

City and Citizens Advisory Committee Recommendations

The City of Coeur d'Alene and the Citizens Advisory Committee prefer Alternative E (a new site with year-round river discharge). Reasons for this preference given by the advisory committee include reduced potential contamination of the Rathdrum Prairie aquifer, elimination of land use conflicts, impractical rehabilitation of equipment at the present treatment site, and beneficial environmental and aesthetic considerations.

Impacts of the Individual Alternatives

The environmental impacts and potential mitigation measures for each project alternative are summarized in the following tables. Only the more significant impacts have been summarized. The first table lists impacts common to each of the action project alternatives (B, E, and G). Separate tables follow with impacts specific to individual alternatives. Following the tables is a short narrative comparison of these impacts.

The mitigation measures listed are possible methods of avoiding or reducing the severity of adverse impacts. Mitigations are not necessarily those that will be implemented should a project be constructed. The adopted mitigation measures will be included in EPA's Record of Decision on the project, which will be prepared after completion of the

Table 1. Impacts Common to the Three Action Alternatives (B, E, G)

Area of Impact	Description of Impact	Possible Mitigation Measures
Groundwater quality	Eventual elimination of on-site wastewater disposal systems serving 5,000 residents now contaminating the aquifer. Centralized treatment capacity for new residents over the aquifer.	None needed
	Possible groundwater contamination from sludge dewatering over aquifer	Relocate sludge disposal to a site off of the aquifer Seal sludge drying beds Mechanically dewater sludge Monitor disposal area leachate
Surface water quality	Elimination of occasional wastewater discharges to the Spokane River that violate state and federal waste discharge requirements	None needed
Costs	Interceptor system capital cost of $5,179,000 (locally funded)	None
Growth implications	Approximately 2,300 urban acres added in the Coeur d'Alene area by 2005	Encourage infill and higher-than-present urban densities
	Facilities plan land use pattern is consistent with city comp plan, but assumes build-out in the unincorporated part of the facilities planning area will occur sooner than in city or county comp plans	More coordination between city and county planning efforts Strengthened city infill policies Increase allowable urban densities in city
	Conversion of 440 acres of prime agricultural land to urban uses	Stronger local restrictions on agricultural land development Preferential property tax assessment Purchase of development rights Conduct environmental assessment of new interceptors serving prime farmland areas prior to construction
	Indirectly accommodates development within 100-year floodplain (Blackwell Island)	Eliminate sewering of Blackwell Island Ensure development meets construction and safety requirements of City provide assurance that island development will not violate EPA floodplain protection policy
	Indirectly accommodates development that may affect wetlands (Blackwell Island)	Review island development plans City provide assurance that island development will not result in wetland loss, in violation of EPA wetland protection policy Conduct wetlands/floodplains assessment

Description of Impact	Possible Mitigation Measures
Level of most public services currently being provided will decrease in the near term	Encourage infill Increase developer-financing of public service Rely more heavily on user cost financing of services More coordination of intracity planning
Problematical fiscal impact	None
Problematical air quality impact	None
Increased urban runoff from 2,300 new urban acres	Identify and plan for control of nonpoint pollution sources through ongoing 208 planning
Increasing demand for electrical and gas supplies	Increase local conservation efforts Modify building codes to improve energy efficiency of new structures
Indirectly accommodate development that may affect archeological resources	City provide assurance that archeological assessments will be conducted prior to development of Blackwell Island and vacant land adjacent to city treatment plant

Table 2. No-Action Impacts and Mitigations

Area of Impact	Description of Impact	Possible Mitigation Measures
Construction losses	None	
Surface water quality	Occasional elevated BOD, nutrient and pathogen levels in river due to discharge of poorly treated or untreated wastewater	Improve stormwater separation Add emergency storage capacity on-site
Spokane River fishery	Intermittent discharge of poorly treated or untreated wastewater could result in lethal contact concentrations of ammonia and chlorine, resulting in fish kills	Improve stormwater separation Add emergency storage capacity on-site
Spokane River uses	Swimming and scuba diving discouraged immediately below outfall; continued health threat to 164 residences extracting domestic water from river	Improve stormwater separation Add emergency storage capacity on-site Improve disinfection Alternative drinking water sources
Groundwater quality	Continued groundwater contamination (nitrates and possible other hazardous wastes) from use of 10,000 on-site disposal systems in planning area	None
	Possible groundwater contamination from sludge dewatering over aquifer	Relocate sludge disposal to a site off of the aquifer Seal sludge drying beds Mechanically dewater sludge Monitor disposal area leachate
Land use conflicts	Increasing odor and visual complaints from present and planned residents near treatment plant	Restrict residential or commercial development of adjacent open land Improve plant odor control techniques Plant a vegetative screen around treatment facilities
Spray area health threat	None	
Costs	Monthly user cost remains at $4.48	None
	Possible fines for NPDES permit violations	None
Resource use	Continued use of 500,000 Kwh of electricity per year at treatment plant	Improve stormwater separation
	Continued use of 24,000 pounds of chlorine per year at treatment plant	Use alternative disinfection medium
Archeological resources	None	None
Growth implications	Local growth could be reduced or halted by PHD aquifer protection policies in absence of wastewater system improvements	Allow development to continue as at present with dry sewers and pursue system improvements at a later date Allow increased urban densities within existing sewer service area

Table 3. Alternative B Impacts and Mitigations

Area of Impact	Description of Impact	Possible Mitigation Measures
Construction losses	Construction within a zone B flood hazard zone Conversion of up to 8.7 acres of vacant land to treatment facilities	Meet building requirements of Coeur d'Alene and Federal Insurance Administration
Surface water quality	Probable increased algal production immediately downstream of outfall in summer months Small ammonia and BOD increases could aggravate existing DO sag near Post Falls	Increase treatment level to full nutrient removal during the summer
Spokane River fishery	Small concentration increases in heavy metals and toxins may affect egg and larval stages of existing fish downstream from outfall	None
Spokane River uses	Increased numbers of pathogens in river below outfall, further discouraging water-contact recreation in that area	Improve disinfection Maximize dilution through diffuser design
	Increased health hazard to 164 residences extracting domestic water from river due to increased discharge	Improve disinfection Maximize dilution through diffuser design Use alternative drinking water source Increase water quality monitoring below discharge point
Groundwater quality	Possible groundwater contamination from increased volume of sludge dewatered over aquifer	Relocate sludge disposal to a site off of the aquifer Seal sludge drying beds Maximize degree of mechanical dewatering Monitor disposal area leachate
Land use conflicts	Conflicts with condominium/commercial development plans on land designated for plant expansion	None
	Possible conflict with NIC plans to expand north of River Avenue	Revise NIC expansion plans
	Would probably discourage residential/commercial development on adjacent land to the north and east	Restrict future adjacent uses to manufacturing/industrial
	Increasing odor and visual complaints from present and planned residents near treatment plant	Restrict residential or commercial development of adjacent open land Improve plant odor control techniques Plant a vegetative screen around treatment facilities
Spray area health threat	None	
Costs	Monthly user costs of $11.59 by 1983 (includes phosphorus removal costs)	
	Treatment system capital cost of $20,240,000, initial local share of $1,775,000	None

Area of Impact	Description of Impact	Possible Mitigation Measures
Resource use	Electrical consumption of 955,000 Kwh per year by 1995	Improve stormwater separation Purchase energy-efficient equipment
	Chemical usage increased to 41,600 pounds per year chlorine and 139,000 gallons per year alum by 1995	Closely monitor dosing Use alternative disinfection mediums
Archeological resources	Possible disturbance of archeological resources associated with Site 10-KA-48	Select alternate treatment site Conduct test excavation and salvage if necessary

Table 4. Alternative E Impacts and Mitigations

Area of Impact	Description of Impact	Possible Mitigation Measures
Construction losses	Conversion of up to 12 acres of open space or mined land to treatment facilities	None
	Possible removal of 6-8 acres of pine trees (Sites 1 and 3)	Place treatment plant in Site 2
Surface water quality	Probable increased algal production immediately downstream of outfall in summer months	Increase treatment level to full nutrient removal during the summer
	Elimination of wastewater influence on a 1-mile stretch of the Spokane River below present outfall	None
	Small ammonia and BOD increases could aggravate existing DO sag near Post Falls	Increase treatment level to full nutrient removal during the summer
Spokane River fishery	Small concentration increases in heavy metals and toxins may affect egg and larval stages of existing fish downstream from outfall	None
	Wastewater removal from 1 mile stretch of river; seasonally occupied by migrating fish	None
Spokane River uses	Wastewater discharge moved 1-2 miles closer to major water contact recreation areas in river, possibly discouraging use	Improve disinfection Maximize dilution through diffuser design Discourage water contact uses by limiting river access Encourage water contact uses upstream from discharge
	Increased health hazard to 164 residences extracting domestic water from river due to increased discharge and closer proximity to outfall	Use alternative drinking water source Increase water quality monitoring below discharge point
Groundwater quality	Possible groundwater contamination from increased volume of sludge dewatered over aquifer	Relocate sludge disposal to a site off of the aquifer Seal sludge drying beds Maximize degree of mechanical dewatering Monitor disposal area leachate Incinerate sludge in wood-powered steam generator (if constructed)
Land use conflicts	No conflicts unless residential/commercial development allowed into industrial zones on adjacent land	Restrict adjacent uses to industrial or open space
	Eliminates existing land use conflicts at present treatment plant site	None
Spray area health threat	None	
Costs	Monthly user cost of $12.16 by 1983 (includes phosphorus removal costs)	None
	Treatment system capital cost of $22,180,000; initial local share of $1,948,000	None
Resource use	Electrical consumption of 1,135,000 Kwh per year by 1995	Improve stormwater separation Purchase energy-efficient equipment
	Chemical usage increased to 41,600 pounds per year of chlorine and 139,000 gallons per year of alum by 1995	Closely monitor dosing Use alternative disinfection medium

Area of Impact	Description of Impact	Possible Mitigation Measures
Archeological resources	No adverse impact at proposed gravel pit site; possible disturbance of archeological resources at other two potential plant sites	Construct facilities at gravel pit site (Site 2) Excavate only in presence of qualified archeologist

Table 5. Alternative G Impacts and Mitigations

Area of Impact	Description of Impact	Possible Mitigation Measures
Construction losses	Conversion of up to 53 acres of prime agricultural land to treatment and storage lagoons	Locate facilities on Ramsey Road site which has no prime agricultural land
Surface water quality	Increased BOD load to the river during winter months only	None
Spokane River fishery	Small concentration increases in heavy metals and toxins may affect egg and larval stages of existing fish downstream from outfall	None
Spokane River uses	Increased health hazard to 164 residences extracting domestic water from river due to increased winter discharge and closer proximity to outfall	Use alternative drinking water source Increase water quality monitoring below discharge point
Groundwater quality	Possible groundwater contamination from increased volume of sludge dewatered over aquifer	Relocate sludge disposal to a site off of the aquifer Seal sludge drying beds Maximize degree of mechanical dewatering Monitor disposal area leachate
	Increase in groundwater nitrate levels and potential contamination with other hazardous wastes from irrigation disposal	Increase irrigated acreage so that annual loading per acre is reduced Inventory industrial and commercial dischargers Comply with CWA pretreatment requirements Monitor effluent quality prior to land disposal Predict treatment capabilities of soil Establish and monitor well network at disposal site Apply wastewater at a rate not to exceed 2.3 inches per week
Land use conflicts	Continued odor and visual complaints from present and planned residents near existing treatment plant	Restrict residential or commercial development adjacent to existing plant Improve plant odor control techniques Plant a vegetative screen around treatment plant
	Possible future conflicts near aerated lagoon and irrigation disposal systems if residential or commercial development occurs on adjacent land	Restrict residential and commercial development adjacent to new facilities Use Huetter Road treatment site and northwest portion of irrigation area Plant a vegetative screen around treatment plant Use best available odor control techniques
Spray area health threat	Health risk on lands adjacent to irrigation area due to wastewater aerosol drift	Thoroughly disinfect wastewater Plant vegetative screen around irrigation area Maintain buffer strip around spray area perimeter Use low trajectory, low pressure sprinklers Cease irrigation in high winds

Area of Impact	Description of Impact	Possible Mitigation Measures
Costs	Monthly user cost of $16.10 (includes phosphorus removal costs)	None
	Treatment system capital cost of $26,870,000; initial local share of $3,175,000	None
Resource use	Electrical consumption of 2,523,000 Kwh per year by 1995	Improve stormwater separation Purchase energy-efficient equipment Use lagoon and irrigation disposal sites closest to Coeur d'Alene
	Chemical usage increased to 41,600 pounds per year of chlorine and 65,500 gallons per year of alum by 1995	Closely monitor dosing Use alternative disinfection medium
Archeological resources	No evidence of archeological resources at construction sites	Consult qualified archeologist should artifacts be unearthed

Final EIS. EPA will not be responsible for all mitigations required. Local, regional, and state agencies will be called upon to initiate those mitigations that are within their respective functional capacities.

Summary Comparison of Alternatives

Under the "no-action" alternative, the chances of occasional discharges of poorly treated or untreated wastewater from the Coeur d'Alene plant would increase. These discharges could lead to fish mortality under certain hydrologic conditions and would increase the health risk to persons drawing domestic water from the Spokane River downstream of Coeur d'Alene. In addition, the groundwater contamination that occurs from septic tank use in the area would not be alleviated. Capital outlay for new facilities would be avoided, and local growth would continue to be restrained by a lack of sewer service capacity.

Construction of either Alternative B or E would effectively eliminate untreated wastewater discharges. This would benefit both the river fishery and human use of the river. These alternatives, however, allow for a gradual increase in the volume of treated wastewater discharged to the river. During low river flow conditions, increased discharges would pose a continuing health threat to water-contact recreationists and persons drawing domestic water from the river. Alternative E would relocate that discharge 1-2 miles closer to the main domestic use and water contact areas.

Alternative B poses continuing land use conflicts due to its proximity to existing and planned residential development. It does, however, require the lowest capital outlay of the action alternatives and would cost the citizens of Coeur d'Alene the least. It also has the lowest chemical and energy demand. Alternative E would move the treatment facilities to an area free of current land use conflicts and would allow the present plant to be removed. Relocation would cost $1,940,000 more than Alternative B (in terms of capital cost). The energy requirements of E would also be slightly higher than B.

Both Alternatives B and E pose problems to the cultural resources of the area. Use of the river and lake shore near Alternatives B and E by the Coeur d'Alene tribe is well documented; of this riverfront area at least part may be eligible for the National Register of Historic Places. In contrast, there is no evidence of cultural heritage resources near proposed sites for Alternative G.

Alternative G would have the most positive effect on surface water quality. It would leave summer discharges at present levels, but the reliability of the plant and the quality of the effluent would be significantly improved. This would improve conditions for both the river fishery and the various beneficial uses of the river. Conflicts between wastewater facilities and adjacent land uses would not be significantly modified. The costs and energy requirements for achieving water quality improvement are high. Alternative G has a capital cost $6,630,000 higher than Alternative B. Energy demands are 2.5 times greater. In addition, the summer irrigation disposal operation poses a potential contamination threat to the area's principal water supply, the Rathdrum Prairie aquifer.

Each of the three alternatives would allow for sewering of up to 5,000 residents currently using septic tanks over the aquifer. Wastewater treatment capacity increases and the planned sewer extensions would accommodate 32,400 new residents in the Coeur d'Alene area by the year 2005. The indirect environmental implications of this growth would be the same for each of these three alternatives.

Coordination

Public participation and coordination for the Coeur d'Alene facilities plan began with an EIS scoping meeting held in Coeur d'Alene on June 4, 1979. The meeting was attended by 19 interested individuals and public agency staff. On June 27, 1979, EPA published the official Notice of Intent (NOI) to prepare an EIS on the project. Since that time, EPA staff and consultants have made frequent contact with local, state, and federal agencies and private citizens in an effort to define project-related environmental issues and collect background data.

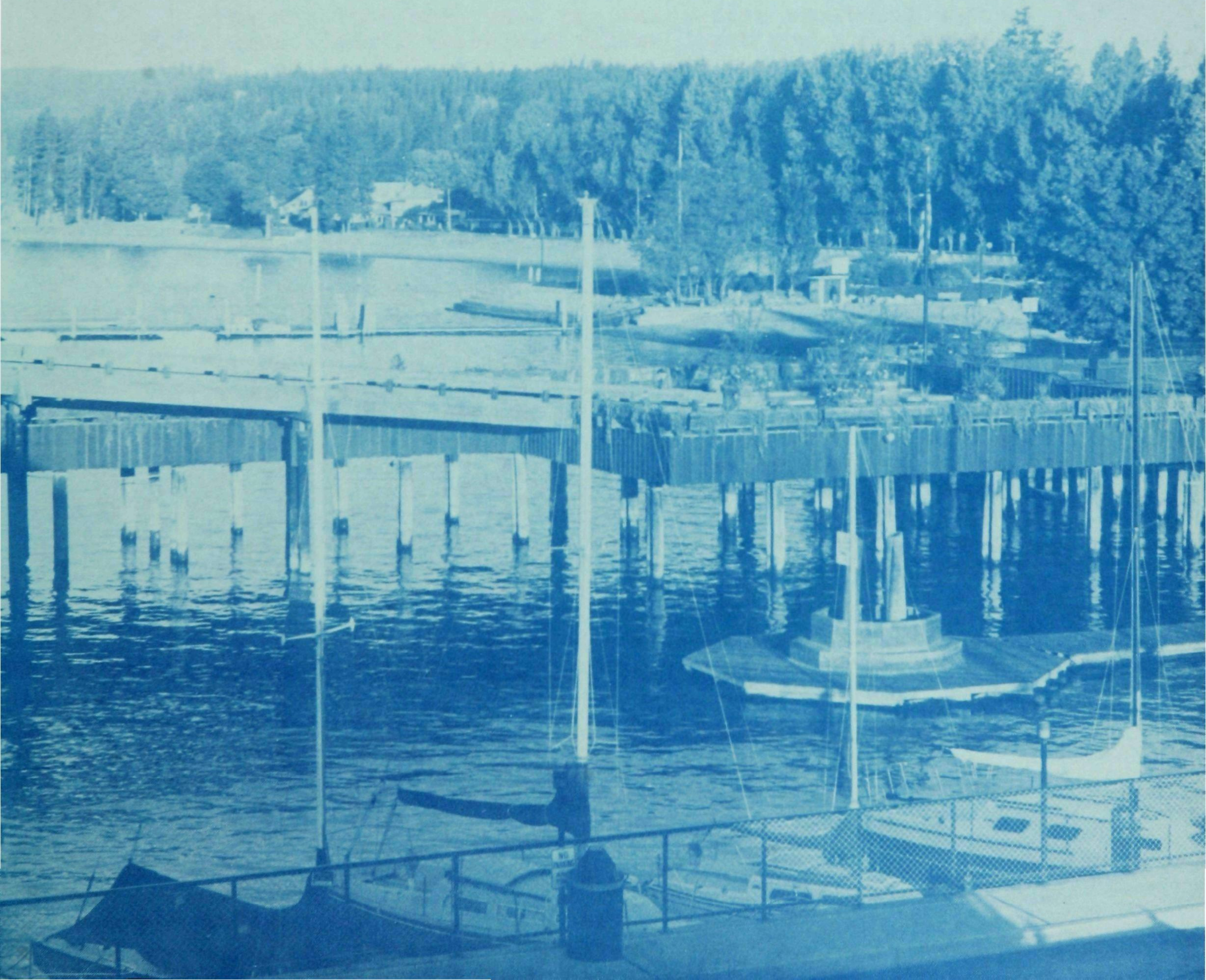
Since November 1979, EPA regularly has attended monthly Coeur d'Alene facilities plan Citizens Advisory Committee meetings. This forum has been useful in identifying project-related environmental issues, discussing facilities plans and EIS progress, and presenting EPA preliminary impact assessments. On September 30, 1980, a public meeting was sponsored by EPA to discuss preliminary findings of the EIS. The final three project alternatives being considered in the facilities plan also were described and discussed.

As a result of this coordination, a variety of project options were generated and some were dropped from consideration. The feasibility of a joint Post Falls-Coeur d'Alene treatment system was given the closest scrutiny, but was eventually dropped for economic and institutional reasons. In addition, the coordination efforts have allowed EPA to identify and focus on the key environmental issues in this EIS.

Further EIS coordination is planned. EPA will conduct a public hearing on the Draft EIS at 7:30 p.m. on February 18, 1981 in the Coeur d'Alene City Council Chambers. All interested citizens are invited to attend. EPA will respond to comment in the Final EIS. All comments received will be given consideration before EPA makes a decision on providing funding to the city for design and construction of the proposed facilities.

CHAPTER 1

EXISTING AND PROPOSED WASTEWATER FACILITIES



Chapter 1

EXISTING AND PROPOSED WASTEWATER FACILITIES

Existing Wastewater Treatment Plant

Treatment Processes

The existing wastewater treatment plant site is located on the Spokane River, downstream of the North Idaho College, and just west of Northwest Boulevard. The site is designated manufacturing-commercial in the city's land use comprehensive plan. The site location is shown in Figure 1-1.

The site has been used for wastewater treatment since 1939, when a small trickling filter plant was constructed. In 1974, this small plant was expanded into the 2.5 MGD trickling filter plant which now serves the needs of the city. The existing plant consists of the following unit processes:

<u>Influent Screening and Pumping</u> - raw wastewater passes through a comminutor, which macerates oversized particles. Pumps then lift the wastewater to ground level.

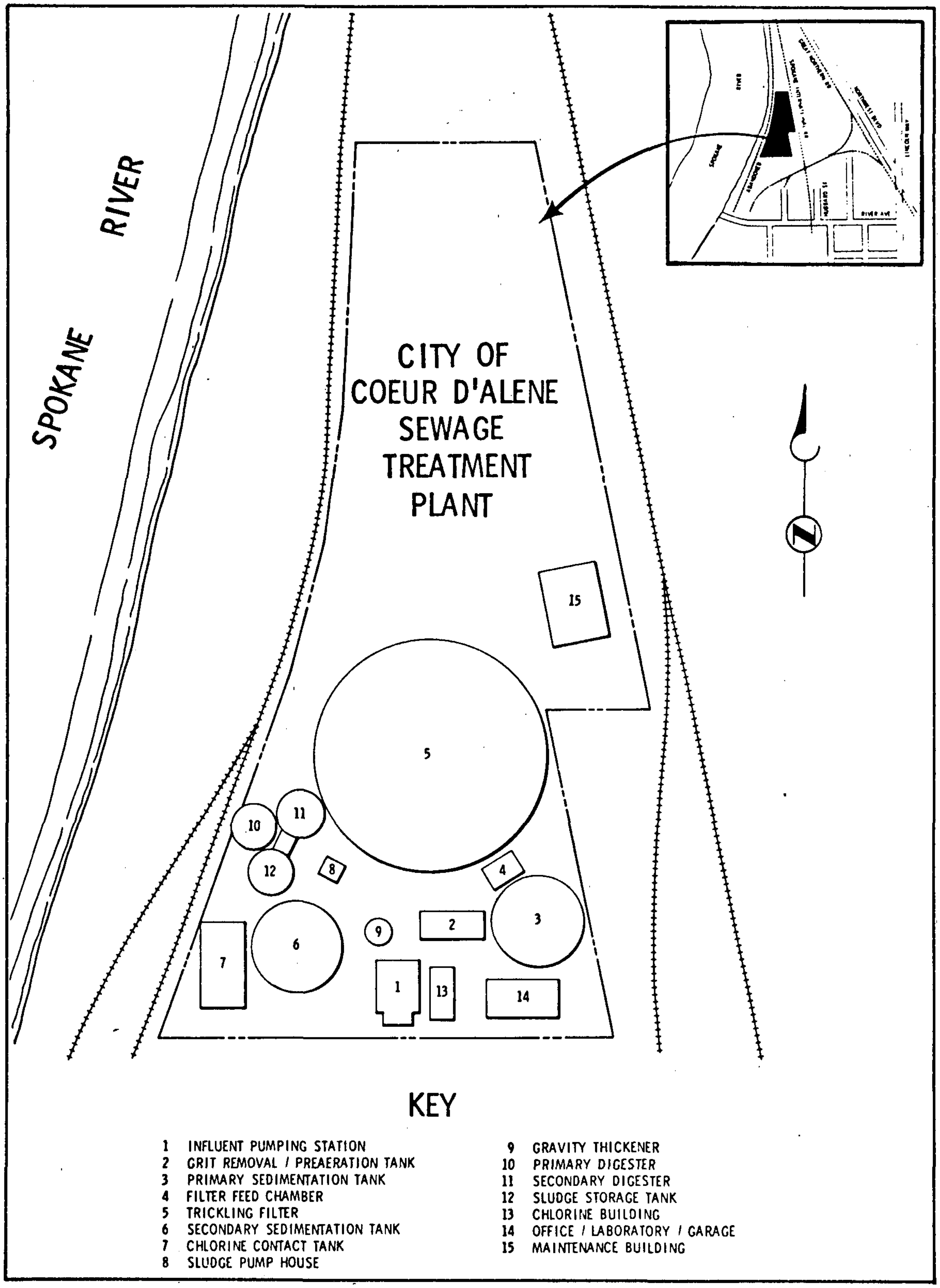
<u>Preliminary Treatment</u> - grit is removed in a single basin and the wastewater is preaerated.

<u>Primary Treatment</u> - heavy organic solids settle in a 60-foot diameter circular basin; settled material is called primary sludge.

<u>Trickling Filter</u> - A 165-foot diameter circular structure is filled with rocks to a depth of 7 feet. Wastewater is distributed at the surface of the rocks by a rotating distributor and trickles down over the rocks. Organic matter is removed from the wastewater by micro-organisms growing on the surface of the rocks.

<u>Secondary Sedimentation</u> - a circular tank settles out biological cell material which "sloughs" from the surface of the rocks in the trickling filter.

<u>Chlorine Contact</u> - chlorine is added to the treated wastewater to provide disinfection prior to discharge. Contact time in the chlorine contact basin is approximately 1 hour.



SOURCE: BROWN & CALDWELL 1980

FIGURE 1-1. EXISTING TREATMENT PLANT LOCATION AND SITE PLAN

Sludge Treatment - sludge removed in the secondary clarifier is pumped to the head of the preaeration basin and is removed from the primary clarifier. Sludge treatment consists of gravity thickening and two-stage anaerobic digestion. Digested sludge is stored on-site and disposed of on agricultural land or in a landfill.

Problems at the Existing Wastewater Plant

Problems at the existing plant are attributable to deterioration of some physical structures due to age (almost 40 years for some facilities) and due to flows in excess of plant capacity during wet weather conditions. Problem areas are summarized as follows:

High Wastewater Flow During Precipitation - this condition results from excessive inflow into the sewer system from stormwater. Sewer separation is presently underway in the fort grounds area near the treatment plant. In addition, a number of stormwater catch basins are being removed from the sanitary sewers throughout the city. These measures are expected to result in significant reductions in wet weather flow.

Insufficient Raw Wastewater Pumping Capacity - the raw wastewater pumping station has four pumps. Proper operation would be for three pumps to handle peak wet weather flow, with the largest pump remaining on standby in case of failure of one of the other three pumps. At present, however, all four pumps must be used during peak wet weather conditions, leaving no standby pump for emergencies.

Preliminary Treatment - the outlet pipe between preliminary treatment and the primary clarifier is inadequate to handle peak wet weather flows and creates surcharging of the preliminary treatment basin. In addition, problems have arisen with the pumps that remove grit from the bottom of the preaeration basin.

Secondary Sedimentation Tank - the principal problem with this basin is its shallow depth, which prevents proper settling of biological material that "sloughs" from the surface of the rocks in the trickling filter. Recently, the outlet has been temporarily modified to increase the water depth.

General - due to a combination of age and severe winter weather, some structures are in poor condition. The primary clarifier has experienced freeze-thaw spalling and structural cracking, the preaeration tank has a leak at its base, and the brick covering the older digesters has deteriorated.

Existing Effluent Quality

Existing effluent quality meets the NPDES limits for all parameters except suspended solids, which occasionally exceed the 30 mg/l limit. Averages of effluent quality analyses for January-April 1980 are shown in Table 1-1.

Alternative Wastewater Treatment Concepts

Introduction

Initially in the facilities planning process, a number of viable alternatives were formulated for evaluation. Alternatives initially developed were:

Alternative A - no action

Alternative B - expand plant at existing site

Alternative C - split plant - existing site with downstream advanced treatment plant

Alternative D - two plants on river

Alternative E - new downstream plant, abandon existing plant

Alternative F - regionalization with Post Falls

Alternative G - two plants - irrigation disposal at north site and river disposal at existing site

With the exception of Alternative A, the other six concepts had various treatment suboptions. These suboptions were: 1) secondary treatment only, 2) secondary treatment plus phosphorus removal, 3) nitrifying secondary treatment plus phosphorus removal, and 4) secondary treatment with land application.

Three different treatment plant sites were used in these evaluations: 1) the existing plant site, 2) a new downstream site located on the river, and 3) a new site located north of the city. Following is a brief description of the alternatives which were considered initially in the facilities plan and the rationale for eliminating certain alternatives prior to detailed evaluation.

Alternative A - No Action

No expansion of treatment facilities would take place, and only limited new hookups to the sewer system would be allowed.

Table 1-1. Average Effluent Analyses
January-April, 1980

Parameter	Concentration
BOD - mg/l[1]	15.8
Suspended solids - mg/l[1]	30.8
Ammonia N - mg/l	9.3
Nitrite N - mg/l	0.09
Nitrate N - mg/l	4.8
Total phosphorus P - mg/l	7.7
Orthophosphate - P - mg/l	7.1
Specific conductance - μmhos/cm	453

[1]Coeur d'Alene NPDES discharge permit stipulates that BOD and suspended solids not exceed a daily average of 30 mg/l.

SOURCE: Idaho Department of Health and Welfare, pers. comm. b

Alternative B - Expand Plant at Existing Site

The existing plant would be expanded from its present capacity of 2.5 MGD to a new capacity of 6.0 MGD. Suboptions were:

B-1 - secondary treatment - river discharge

B-2 - secondary plus phosphorus removal - river discharge

B-3 - nitrifying secondary plus phosphorus removal - river discharge

B-4 - secondary treatment - irrigation disposal

B-1 was dropped due to probable discharge limitations, B-3 was dropped because nitrification probably would not be required for river discharge, and B-4 was dropped due to cost and operational limitations. Only Alternative B-2 was retained for more detailed evaluation.

Alternative C - Split Plant - Existing Site with Downstream Advanced Treatment Plant

The existing plant would provide 2.5 MGD of treatment capacity with an additional 3.5 MGD provided at a downstream treatment site. Suboptions of this alternative were:

C-1 - secondary treatment - downstream river discharge

C-2 - secondary plus phosphorus removal - downstream river discharge

C-3 - nitrifying secondary plus phosphorus removal - downstream river discharge

C-4 - secondary treatment - irrigation disposal

All of these alternatives were dropped during the initial screening process because of potential operating problems and high cost. Alternative C-3 was dropped because nitrification probably would not be required for river discharge.

Alternative D - Two Plants on River

Two treatment plants would be utilized. The existing plant would operate at 2.1 MGD and a second plant operating at 3.9 MGD would be located downstream. Suboptions of the basic alternative were:

D-1 - secondary treatment at both sites

D-2 - secondary treatment at existing site and secondary plus phosphorus removal downstream

D-3 - secondary treatment plus phosphorus removal at both sites

D-4 - secondary treatment with phosphorus removal at existing site and nitrified secondary plus phosphorus removal downstream

D-5 - nitrified secondary plus phosphorus removal at both sites

Alternative D-1 was dropped because of probable discharge limitations, while D-2, D-3, D-4, and D-5 were dropped due to operational problems and high cost. After screening these alternatives it was concluded that treatment at two different locations was not cost-effective.

Alternative E - New Downstream Plant, Abandon Existing Plant

All treatment would be accomplished at a new treatment plant located 1-2 miles downstream, and the existing facilities would be abandoned. Suboptions of this alternative were:

E-1 - secondary treatment - river discharge

E-2 - secondary treatment plus phosphorus removal - river discharge

E-3 - nitrifying secondary plus phosphorus removal - river discharge

E-4 - secondary treatment - irrigation disposal

Of these, only E-2 was retained for detailed evaluation. E-1 was dropped due to probable discharge limitations, E-3 was dropped because nitrification probably would not be required, and E-4 was dropped due to land area requirements.

Alternative F - Regionalization With Post Falls

Raw wastewater would be conveyed to an expanded Post Falls treatment plant, which would have a capacity of 8.4 MGD. Of this 8.4 MGD, 6.0 would be for Coeur d'Alene and 2.4 would be for Post Falls. Suboptions involving river discharge and irrigation were evaluated; due to high cost, however, all regionalization alternatives were deleted from further consideration.

Alternative G - Two Plants - River Site and Site North of City

Two treatment facilities would be used. One site would be north of town and would use irrigation for effluent disposal.

The second site would be on the river at either the existing or the downstream site. Suboptions of this alternative were:

G-1 and G-3 - secondary treatment at both locations

G-2 - secondary treatment at north site and secondary plus phosphorus removal at downstream site

G-4 - secondary treatment at north site and secondary plus phosphorus removal at the existing site

G-5 - secondary treatment at north site and nitrified secondary plus phosphorus removal at downstream river site

Of these five alternatives, only G-2 was retained for detailed evaluation. The remaining four alternatives were dropped from consideration due to water quality requirements, potential operating difficulties, and cost.

Alternatives Retained for Detailed Evaluation

Of the 27 alternatives developed during the initial screening process, four were selected for detailed economic, operational and environmental evaluation. These were the no-action alternative and Alternatives B-2, E-2, and G-2 (henceforth referred to as Alternatives B, E, and G). Each of these alternatives is discussed in detail in the following sections.

Alternative A - No Action. This concept is a continuation of the present practice. Several areas would continue to contribute wastewater to the existing 2.5 MGD wastewater facility. No changes would be made in the facility either to increase its capacity or to correct existing problems. Areas of Coeur d'Alene which are not sewered would continue to rely on septic tanks and would continue to add nitrate to the groundwater.

In all likelihood, the limitation on sewer line extensions imposed by the Idaho Department of Health and Welfare (IDHW) would continue. No expansions to the sewer system would be allowed, with the exception of the Interceptor A project, and no new connections to the sewer system would be allowed except for homes adjacent to existing sewer mains. The IDHW has indicated that this suspension would remain in effect until additional treatment capacity is made available. One method of achieving additional capacity without expanding or modifying the treatment facility is reduction of stormwater inflow. Separation of the stormwater and sanitary sewer systems is presently underway in various parts of the city and will result in the reduction of stormwater inflow. Separation of those systems will allow additional treatment plant capacity for new connections to the sanitary sewer system. Estimated cost of this alternative would be $81 per year for existing homes on septic tanks. This cost would cover periodic drainfield replacement and septic tank pumping.

The city presently has an agreement with the Panhandle Health District (PHD) which restricts any new annexation until design work on new sewage treatment facilities is underway. Under a no-action alternative, it is expected that this agreement would continue to remain in force.

Alternative B - Expand Plant at Existing Site. Under Alternative B, all wastewater treatment facilities would be located at the existing plant site. Treatment would consist of trickling filtration followed by activated sludge. Phosphorus removal would be accomplished on a seasonal basis, probably by the addition of alum. The ultimate capacity of the plant would be 6.0 MGD by the year 2005, with 4.2 MGD constructed initially and an additional 1.8 MGD constructed in 1995. A schematic flow diagram and proposed layout of the treatment facilities are shown in Figure 1-2.

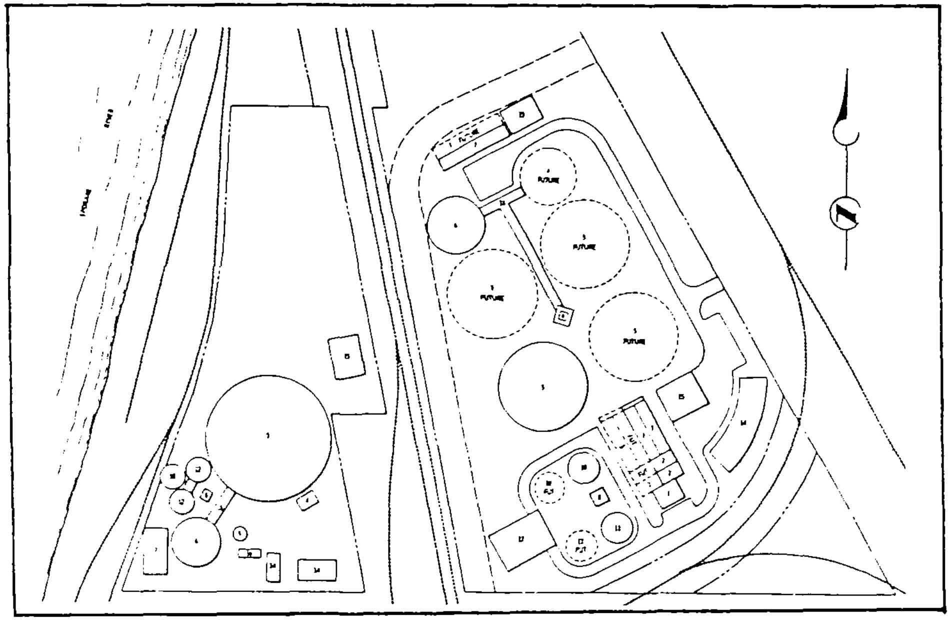
The estimated total present worth cost for this alternative, constructed to a capacity of 6.0 MGD, is $22,100,000. Annual operation and maintenance costs (expressed in 1980 dollars) in year 1990 would be $714,000 per year.

Alternative E - New Downstream Plant, Abandon Existing Plant. Under this alternative, all wastewater facilities at the existing treatment plant would be abandoned and demolished. A new 4.2 MGD treatment facility would be constructed at the downstream site shown in Figure 1-3. In 1995, the plant would be expanded to 6.0 MGD. Discharge would be directly to the Spokane River on a year-round basis.

The treatment process would consist of trickling filtration followed by activated sludge. Alum addition would be used from May 1 to October 31, to enhance phosphorus removal. Plant layout and a schematic flow diagram of the treatment process are shown in Figure 1-4.

It is estimated that the total present worth cost for Alternative E (6.0 MGD) would be $25,070,000. Annual operation and maintenance costs (in 1980 dollars) for year 1990 would be $738,000.

Alternative G - Two Plants - Irrigation Disposal at North Site and River Disposal at Downstream Site. Two treatment plants would be utilized. One plant would be a new 3.8 MGD (2.0 MGD constructed initially) secondary plant at a site north of the city, as shown in Figure 1-5. During the growing season, discharge from this plant would be used to irrigate agricultural crops. During the winter months, effluent would be discharged to the Spokane River. The second



KEY

1 INFLUENT PUMPING STATION
2 GRIT REMOVAL / PREAERATION TANK
3 PRIMARY SEDIMENTATION TANK
4 FILTER FEED CHAMBER
5 TRICKLING FILTER
6 SECONDARY SEDIMENTATION TANK
7 CHLORINE CONTACT TANK
8 SLUDGE PUMP HOUSE
9 GRAVITY THICKENER
10 PRIMARY DIGESTER
11 SECONDARY DIGESTER
12 SLUDGE STORAGE TANK
13 BLOWERS CHLORINATION
14 ADMINISTRATION/LABORATORY
15 MAINTENANCE SHOP
16 ELECTRICAL STRUCTURE
17 SOLIDS DEWATERING BUILDING
18 SOLIDS CONTACT CHANNEL

SOURCE: BROWN & CALDWELL, 1980

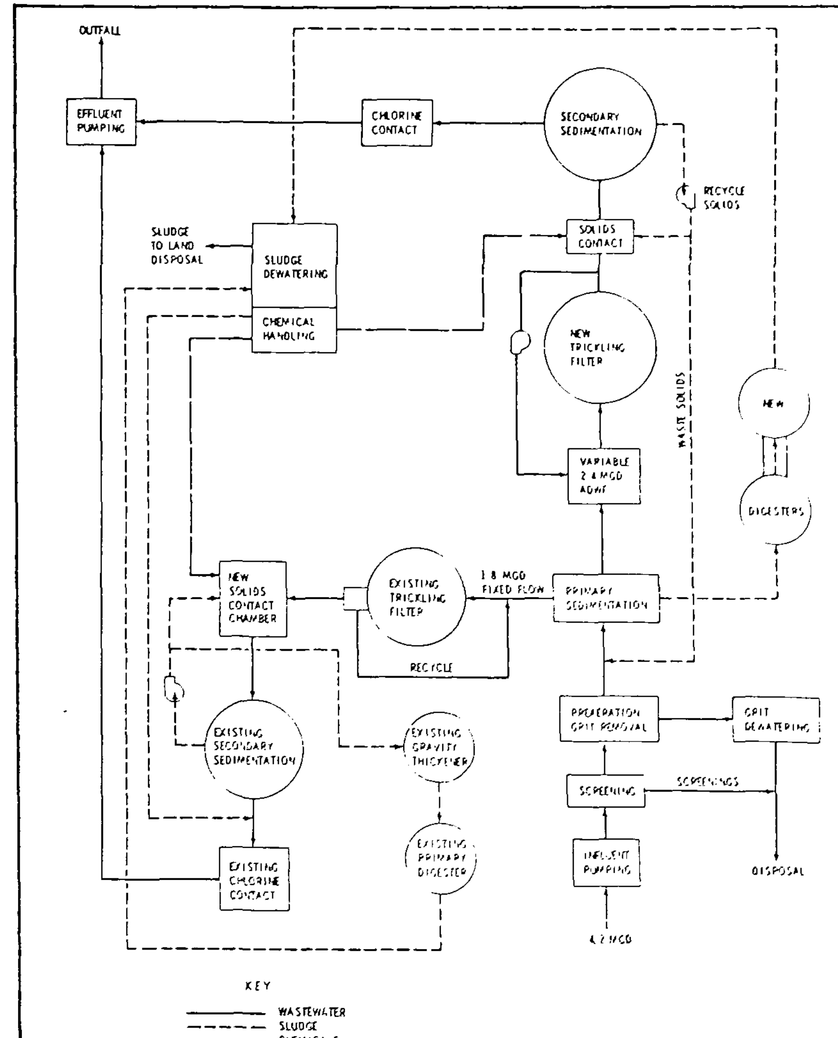
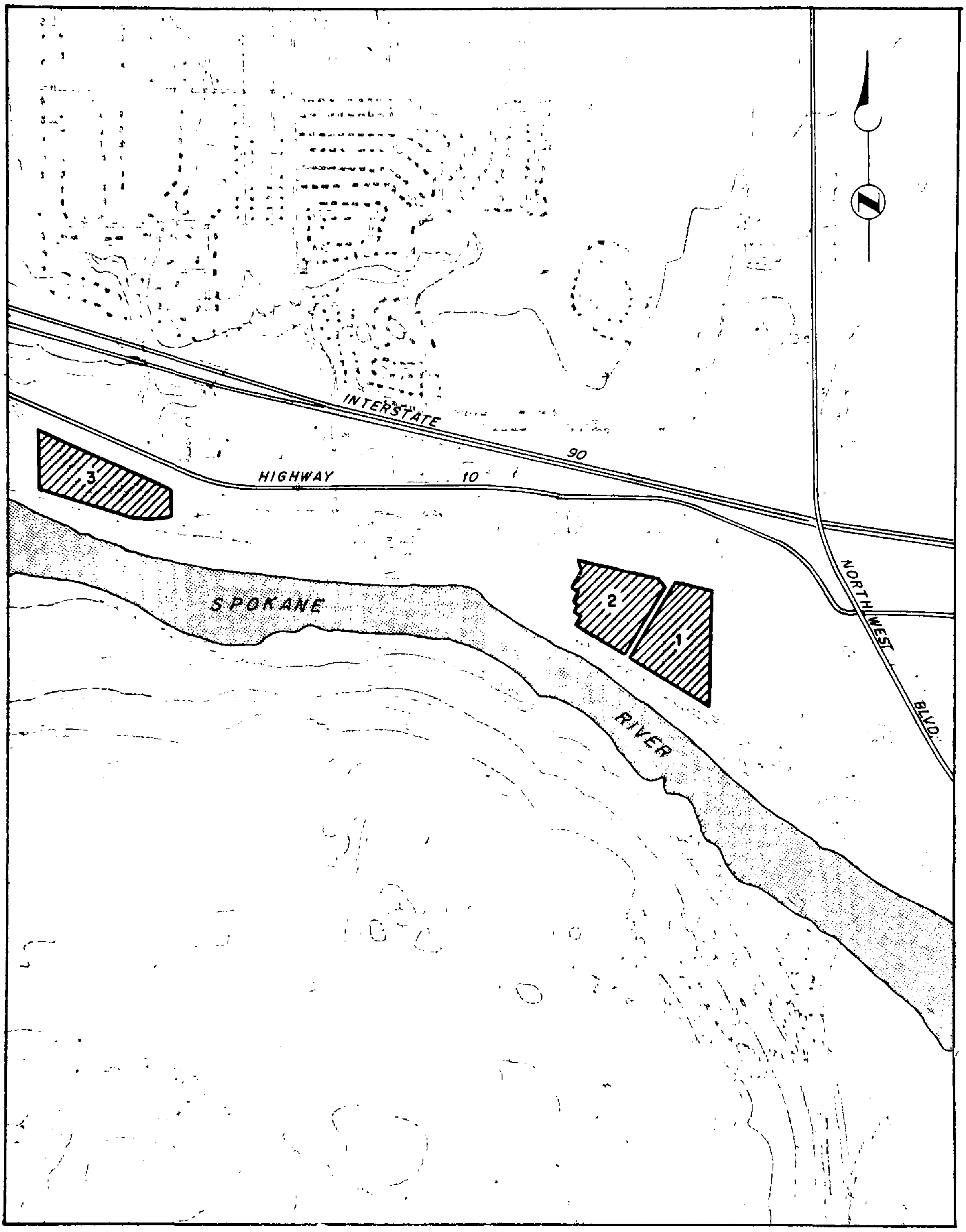
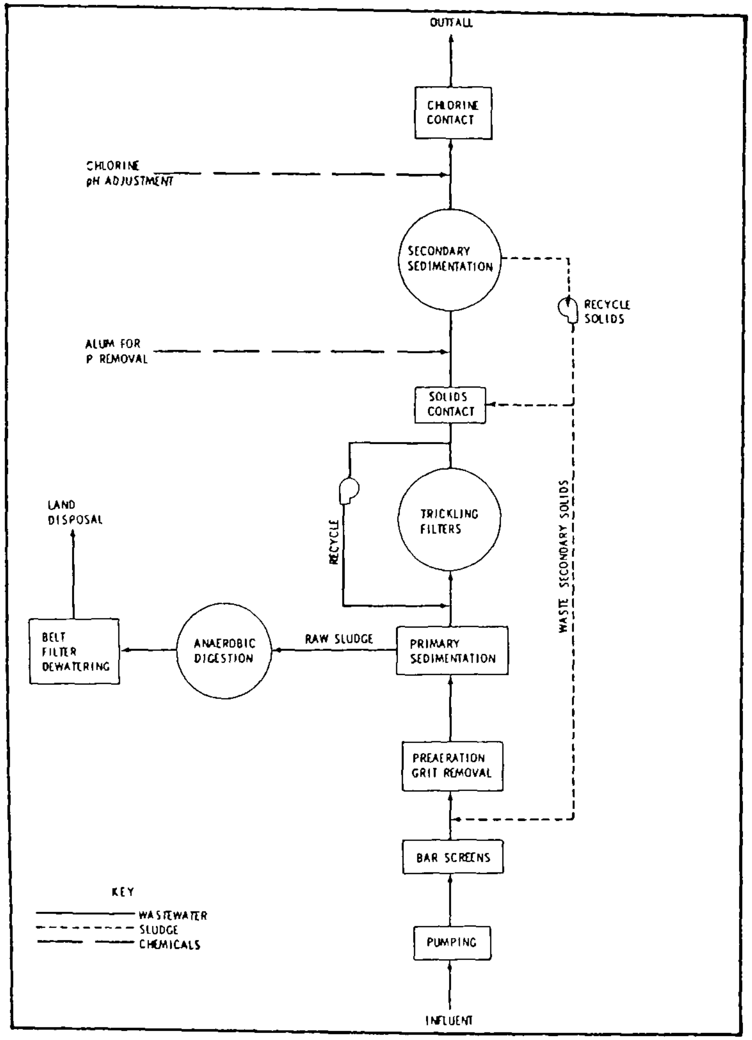


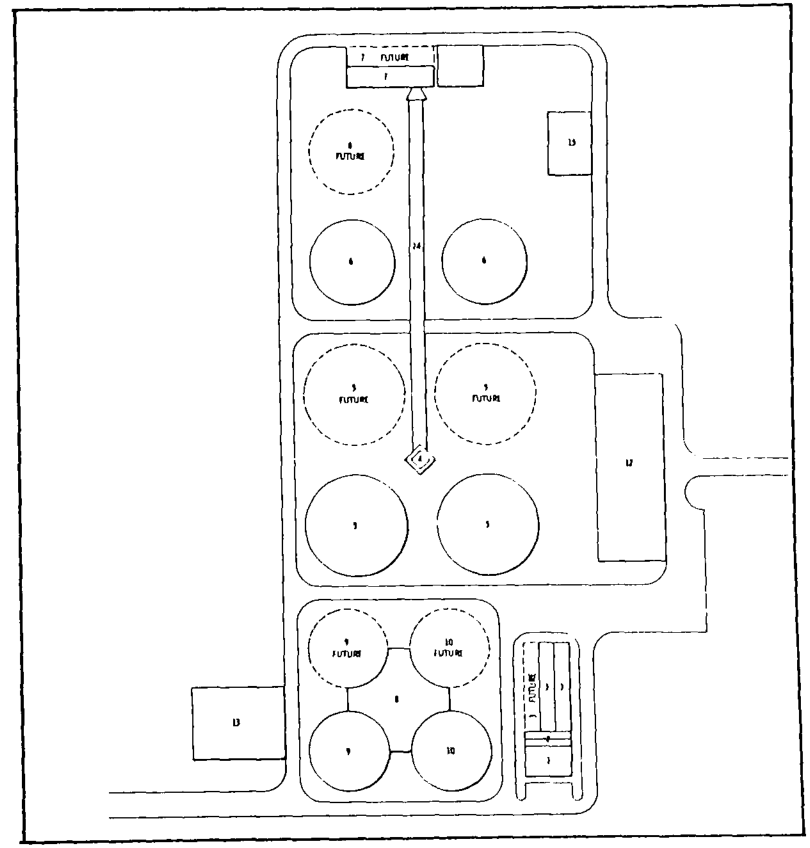
FIGURE 1-2. ALTERNATIVE B SCHEMATIC DIAGRAM & SITE PLAN



SOURCE: MODIFIED FROM BROWN & CALDWELL, 1980

FIGURE 1-3. ALTERNATIVE E TREATMENT PLANT SITE ALTERNATIVES





KEY

1 INFLUENT PUMPING STATION	9 PRIMARY DIGESTER
2 GRIT REMOVAL / PREAERATION TANK	10 SECONDARY DIGESTER
3 PRIMARY SEDIMENTATION TANK	11 CHLORINE BUILDING
4 FILTER FEED STATION	12 OFFICE / LABORATORY / MAINTENANCE
5 TRICKLING FILTER	13 SOLIDS DEWATERING BUILDING
6 SECONDARY SEDIMENTATION TANK	14 SOLIDS CONTACT CHANNEL
7 CHLORINE CONTACT TANK	15 GARAGE
8 SLUDGE PUMP HOUSE	

SOURCE: BROWN & CALDWELL, 1980

FIGURE 1-4. ALTERNATIVE E PROCESS SCHEMATIC DIAGRAM AND SITE PLAN

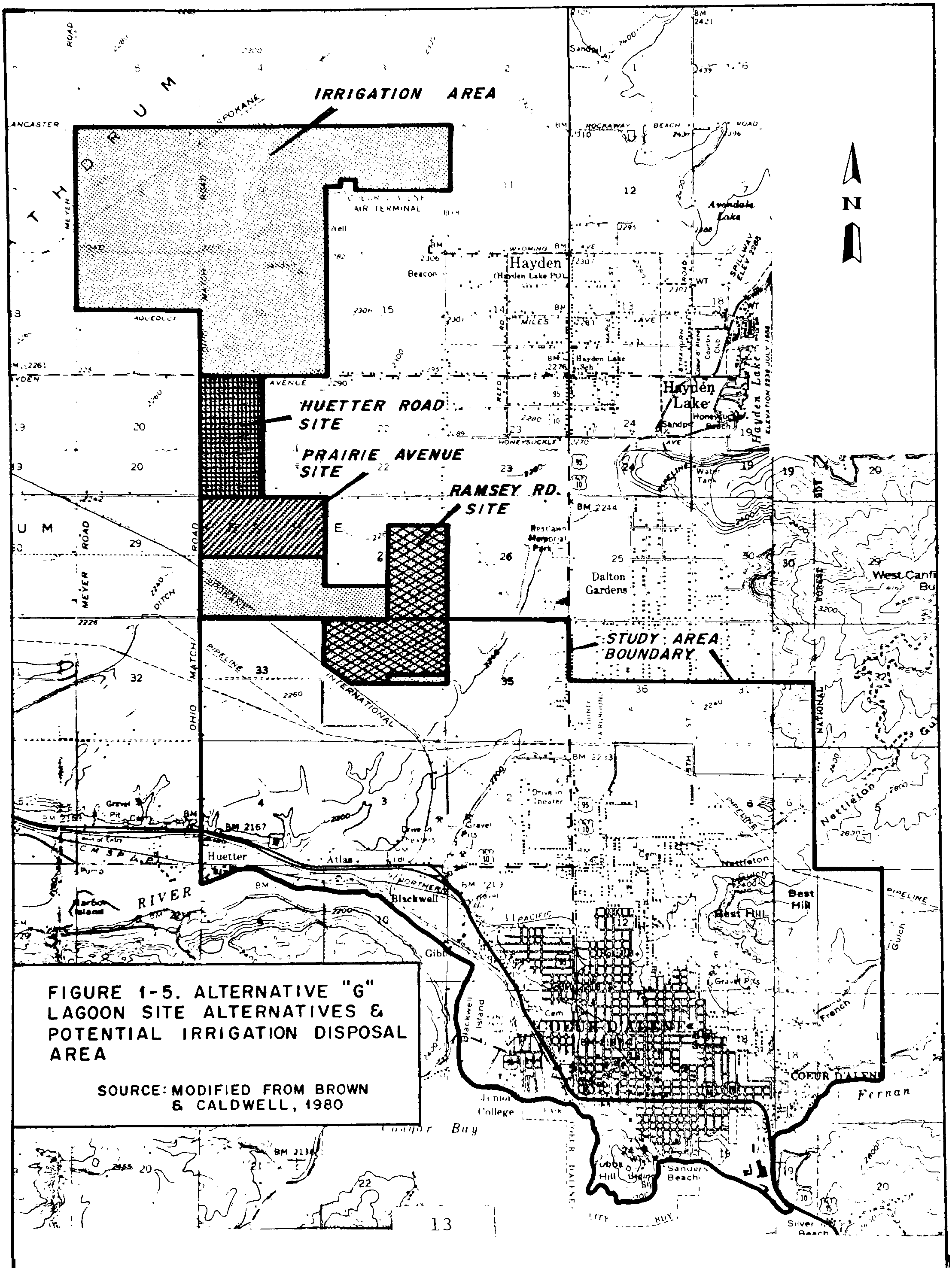


FIGURE 1-5. ALTERNATIVE "G" LAGOON SITE ALTERNATIVES & POTENTIAL IRRIGATION DISPOSAL AREA

SOURCE: MODIFIED FROM BROWN & CALDWELL, 1980 plant would be a 2.2 MGD facility at the existing plant site, and discharge would be directly to the river throughout the year. The existing plant would be improved to provide secondary treatment, with seasonal use of alum for phosphorus removal. Schematic flow diagrams of Alternative G have not been prepared, but the existing plant would remain as shown in Figure 1-1.

Estimated total present worth cost of the new facilities and modification of the old facilities is $27,280,000. At the midpoint of the first phase planning period (1990), estimated operation and maintenance costs, expressed in 1980 dollars, would be $899,000 per year.

Sewer System Extensions

As a part of the overall facilities plan, extensions of the existing sewer system are proposed. These extensions are divided into near-term projects which will pick up existing waste loads currently served by septic tank systems, and long-term projects which would be required as the city grows and the city comprehensive plan densities are reached. All of the wastewater treatment alternatives previously described include sewer system extensions.

The general locations of these extension projects are shown in Figure 1-6. Table 1-2 lists the probable projects and the projected sewer diameters and lengths.

Probable Effluent Limitations

At the present time, it is not certain what the effluent limitations will be for Alternatives B, E, and G. Based upon knowledge of water quality-related issues, probable effluent limitations are as shown below:

	Alternative			
	B	E	G (River)	G (Land Application)
BOD_5 - mg/l				
May 1 to Oct 21	10	10	10	30
Nov 1 to Apr 30	30	30	30	30
SS - mg/l	30	30	30	30
Total phosphorus - mg/l (Apr to Oct)	85% removal	85% removal	85% removal	No limit
Fecal coliform (No/100 ml)	200	200	200	No limit

NOTE: All figures are daily averages.

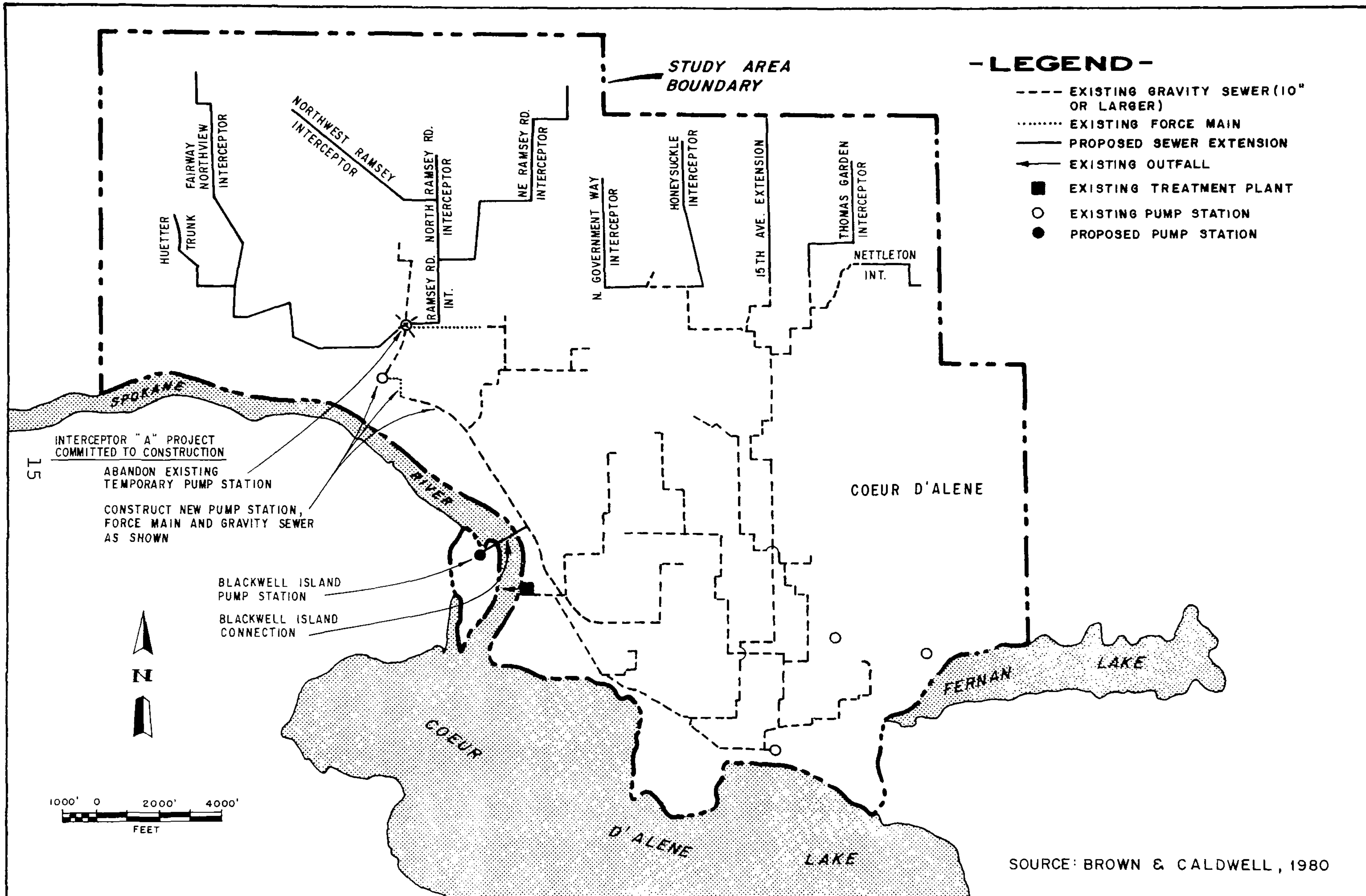


FIGURE 1-6. PROPOSED INTERCEPTOR SYSTEM EXTENSION

Table 1-2. Interceptor Extension Costs and Sizes

Facility element	Diameter, inches	Length, feet	Cost estimate[a] $1,000
Near-Term Projects			
15th Avenue Extension	10 8	2200 2750	280
Honeysuckle Interceptor	10 8	2500 2800	296
North Government Way Interceptor	12 10	2800 1800	298
Ramsey Road, Phase I	21	3150	331
Northeast Ramsey Interceptor	18	3000	270
Fairway/Northview Interceptor (to Atlas Road)	15	5650	441
Subtotal -- Near-Term			1,916
Long-Term Projects			
Nettleton Interceptor	10	3000	180
Thomas Garden Interceptor	12 10	4350 1000	356
Ramsey Road, Phase II	15	1800	140
Northeast Ramsey Interceptor, Phase II	18 15 12 10	2200 2000 1000 1000	482
North Ramsey Road Interceptor	10	1600	96
Northwest Ramsey Interceptor	15 12 10	3000 1350 1500	414
Fairway/Northview Interceptor, Phase II	15 12 10	7350 1200 1600	751
Huetter Trunk	12 10	2400 1400	247
Blackwell Island Connection	0.5 mgd pump station with 1300 feet of force main/sewer		597
Subtotal -- Long-Term			3,263
TOTAL			5,179

[a]ENR-CCI 3500, includes allowance for engineering and contingencies.

SOURCE: Brown and Caldwell, 1980.

Action Proposed by the City of Coeur d'Alene

The city and the Coeur d'Alene Citizens Advisory Committee have selected Alternative E as the preferred alternative. This plan provides for the construction of a new treatment plant 1-2 miles downstream from the existing plant, with year-round discharge to the Spokane River. The Citizens Advisory Committee rejected Alternative G (treatment lagoons and land discharge) because of the risk of contaminating the Rathdrum Prairie aquifer (Thompson, pers. comm.). The committee also felt that moving the treatment plant from its present site would improve environmental and aesthetic qualities of the area and provide a site compatible with the city's comprehensive land use plan and future development. The age and deteriorated condition of equipment at the present treatment plant contributed to the selection of Alternative E over Alternative B (expanding existing facilities).

CHAPTER 2

ENVIRONMENTAL SETTING AND CONSEQUENCES OF THE ALTERNATIVES

Chapter 2

ENVIRONMENTAL SETTING AND CONSEQUENCES OF THE ALTERNATIVES

Introduction

This chapter discusses major environmental issues associated with the City of Coeur d'Alene's proposed wastewater facilities plan. The issues have been identified through the planning process and by discussing the project with government agency personnel, local residents and other concerned individuals. Each subsection deals with an individual issue. The issue is identified, pertinent environmental setting data are presented or cited, the relationship of each facilities plan alternative to the issue is discussed and mitigation measures are suggested where significant adverse environmental impacts have been identified.

Significant Construction Impacts

Construction of wastewater facilities typically results in an assortment of short-term nuisance impacts to man. This includes the production of noise, dust and aesthetic disruptions as well as creation of temporary access problems and safety hazards. These impacts are usually insignificant and readily mitigable. Occasionally more significant impacts are created; these might include destruction of or disturbance to valuable wildlife habitat, historic or cultural resources, agricultural land, scenic vistas or major recreation areas. Significant construction impacts identified after reviewing the Coeur d'Alene facilities plan alternatives are described below. The no-action alternative would have no significant construction disruptions.

Treatment Plant Construction

Coeur d'Alene has investigated several sites that could be used for expanded wastewater treatment facilities. Facilities plan Alternative B calls for expansion of facilities to the north and east of the existing treatment plant (see Figure 1-2). Some of this land is currently vacant while other parts are used for log storage. The site is bisected by a railroad spur that services the lumber mill to the south of the treatment plant site. Construction at the site could create several short-term problems. First, access to the site would probably be via River and Hubbard Avenues. These are narrow streets, so construction-related truck traffic could easily create congestion and a safety hazard. Construction traffic also would add to noise along a small piece of Lincoln Way and on Hubbard and River Avenues. This would affect residents on these streets.

Actual on-site construction would create temporary noise, dust and visual impacts to residents southeast of the proposed expansion on River Avenue and Military Drive. It could also disrupt rail service to the adjacent lumber mill. Construction is planned on both sides of the Spokane International Railroad Company line that passes along the eastern edge of the existing treatment plant. This rail is used once a day (Monday through Friday) to service the lumber mill (Spokane International Railroad Company, pers. comm.). If this line were blocked for any reason during the construction period, it could create a hardship for the mill. Finally, the construction activity would be highly visible to persons passing along Northwest Boulevard.

Treatment plant construction for Alternative B would not affect significant wildlife habitat, threatened or endangered plants or animals, wetlands, or valuable agricultural land. However, the site is within a flood hazard zone, according to initial maps prepared by the U. S. Federal Insurance Administration (FIA) in 1976. Any new structures constructed in the area would have to meet flood protection specifications of the City of Coeur d'Alene and the FIA.

Three separate treatment plant sites have been considered for Alternative E. Each is between U. S. Highway 10 and the Spokane River near Atlas (see Figure 1-3). Construction at Sites 1 and 2 would have few significant impacts on adjacent land uses because they are primarily industrial, transportation-related or vacant. Access for construction equipment might pose a problem, as Burlington Northern Railroad tracks would have to be crossed. This could be accomplished via existing crossings at the Central Pre-Mix gravel operation to the north. Site preparation at Site 1 might require cutting 6-8 acres of pine trees; there is already a cleared area on the site, but there is also a sizable stand of pines. The amount of tree removal would depend on the actual location of new structures. Few if any trees would have to be cut if Site 2 were to be used, as it is a mined gravel area. Construction at Site 3, a mile further downstream, would also have few impacts on adjacent land uses. Lumber operations are located both east and west, the river borders the property on the south, and U. S. Highway 10 runs along the northern edge. Construction traffic could utilize Highway 10 and dirt access roads that already enter the property. A large number of pine trees would have to be cleared from the site, as it is covered by a scattered stand of timber. Movement of trucks and logs also could be temporarily interrupted at Site 3, as it is criss-crossed by numerous dirt haul roads leading from the river log storage area to the lumber operations.

No significant wildlife habitat, rare or endangered plants or animals, wetlands, prime agricultural land or flood-plain areas would be affected by construction on any of the Alternative E treatment plant sites.

Treatment plant construction for Alternative G would involve two separate locations. The existing Coeur d'Alene treatment plant would be renovated but not expanded, so construction impacts at that site would be insignificant. Some construction-related traffic could be expected on River and Hubbard Avenues.

The second treatment site would be located north of Coeur d'Alene on one of three potential parcels. The aerated lagoon treatment system would ultimately use 53 acres of land. All three proposed sites are currently used for growing grass seed.

Construction at the Ramsey Road site (Figure 1-5) would be visible from Ramsey Road and probably from Atlas Road and Prairie Avenue. Approximately 6-8 homes to the north of the site and two to the east of the site would be directly affected by the noise, dust and visual detraction normally associated with land grading and construction activity. These would be short-term nuisances and could be mitigated by proper construction practices. Construction traffic access would probably be via Ramsey Road, which is a relatively narrow, two-lane county road. Special provisions would have to be made to ensure safe movement of trucks on and off of this road. One soil type covers the Ramsey Road site - McGuire-Marble Association. It is not considered prime agricultural soil.

The Prairie Avenue lagoon site is a 320-acre parcel south of Prairie Road between Atlas and Huetter Roads. Construction activity at this site would create temporary noise and dust nuisances to about four residences across the street to the north and five or six homes to the east. Construction access would be easily accomplished from either Prairie Avenue, Huetter Road or Atlas Road. Avonville fine gravelly silt loam soils cover the northern and western two-thirds of the site. If the 53 acres of lagoons were constructed in this area, prime farmland would be lost. The

Avonville gravelly coarse sandy loam that covers the south-eastern portion of the site is not considered prime.

The Huetter Road site is immediately north of the Prairie Avenue site (Figure 1-5). Nuisance noise and dust from construction activity possibly would affect about five houses on the southern perimeter of the site and two or three houses on the northern edges of the site. The 320-acre Huetter Road site is covered almost entirely by prime agricultural soils - Avonville fine gravelly silt loam. Small islands of Narcissi silt loam are also present, but they are not considered prime land. Construction at this site could remove up to 53 acres of prime farmland from production.

None of the Alternative G treatment lagoon sites include significant wildlife habitat, rare or endangered plant species, floodplains or wetlands.

Spray Disposal Area Construction

No significant direct impacts are expected to result from installation of a spray irrigation system for disposal of effluent as planned in Alternative G (Figure 1-5). Specific locations for pipes and pumps have not been identified, but the amount of construction activity would be small and probably would not affect adjacent residences or traffic.

Pipeline Construction

The facilities plan identifies a number of wastewater interceptor system extensions that would be needed to provide central wastewater treatment service to the unsewered parts of the planning area (Figure 1-6). These extensions would be constructed in a sequence determined by the City of Coeur d'Alene. Nearly all of the routes follow existing roads or rail lines. Pipelines would be constructed within those rights-of-way. Pipelines would be constructed regardless of which project alternative is implemented, except for "no-action".

As with most pipe-laying operations, impacts would be primarily short-term nuisances. Noise, dust, access disruption, and traffic delays could be expected along all routes. Construction of the line out to Blackwell Island could create more significant impacts, depending upon whether the pipe is placed along the bottom of the river or hung from the Highway 95 bridge. If it is hung from the bridge, some traffic delays could be expected on the highway. However, if the pipeline is placed in the river, a temporary navigational hazard would be created and river turbidity would undoubtedly increase. A Section 404 permit would be needed for any dredging or filling within the stream or wetland areas on the perimeter of the island. A temporary increase in turbidity would also be likely to occur in the river.

Outfall Construction

Each alternative would require at least one discharge line in the Spokane River. Under Alternative B, the existing outfall would be abandoned and a new one would be extended farther into the river. It would include a diffuser system. Alternative E would require a similar outfall, but it would be located downstream opposite the new treatment plant site. Alternative G would use two outfalls; a new one at the present treatment plant site and a new one located in the vicinity of Atlas for the winter discharge from the north treatment plant. Placement of the pipeline and the diffuser along the bottom of the river would undoubtedly create some short-term turbidity in the stream. Construction equipment might also pose a short-term hazard to boaters or rafters on the river. An effort should be made to disturb as little of the stream bank and bottom as possible during construction so that turbid conditions and downstream sedimentation are minimized. Bank restabilization and revegetation should be employed to reduce the chances of long-term erosion and sedimentation along the outfall route.

Mitigation Measures

Most construction-related impacts, whether caused by treatment plant or pipeline construction, could be readily reduced to acceptable levels by sensible operational techniques. Noise and dust suppression measures have become standard operational procedures in most areas. Working hours should be limited to the 7:00 a.m. to 5:00 p.m. period of weekdays; all graded and excavated surfaces should be periodically watered to reduce nuisance dust, and disturbed surfaces should be compacted and covered or revegetated to avoid subsequent wind or rain erosion. Truck traffic moving to and from construction zones should use extreme caution in residential or recreational areas. Open trenches and surface disturbances should be properly marked with warning signs. Heavy equipment and hazardous building materials should be stored in a fenced corporation yard after working hours to avoid creating a safety hazard.

Alternative G is the only alternative that would directly remove prime farmland from production. If one of the other alternatives is selected, there will be no direct loss. However, if Alternative G is selected, the impact could still be avoided by using the Ramsey Road lagoon site rather than the Prairie Avenue or Huetter Road sites.

If the pipeline to Blackwell Island is built, construction-related river turbidity and wetlands encroachment could be avoided by hanging the pipe on the U. S. Highway 95 bridge rather than placing it in the water.

Surface Water Quality Changes

Existing Water Quality

Available records indicate that water quality in the Spokane River between Coeur d'Alene and Post Falls (Table 2-1) is satisfactory although several parameters are not in compliance with proposed draft EPA water quality criteria (Federal Register). Various factors influence the level of pollutants in the river during any given period of time. These include the quality of water leaving Lake Coeur d'Alene, substances discharged into the river by industrial and municipal concerns, urban and agricultural drainage, log storage, and impoundment structures. Intense public concern in the region not only focuses on the effect these factors have on river water quality but also on water quality of the Rathdrum Prairie aquifer and the eutrophication of Long Lake downstream in Washington.

Previous studies have identified parameters which either exceed existing water quality criteria (U. S. EPA, 1976) or are of general concern (Yearsley, 1980; Funk, 1976). Bacterial concentrations; elevated zinc, lead, and copper concentrations; oxygen depressions downstream of the immediate study area; nutrients and toxins are the primary areas mentioned. Current mean bacterial concentrations measured as fecal coliform counts (U. S. EPA, 1976) meet the Class A Idaho standard of 50/100 ml (Table 2-1), although concentrations exceed 100/100 ml during the low flow summer months (Funk, 1976). Zinc concentrations due to past and present mining activity on the south fork of the Coeur d'Alene River (Reid, 1961) are high, especially during spring runoff. The mean concentration of 0.245 mg/l exceeds criteria for protection of freshwater organisms (.05 mg/l) but not criteria for domestic water supplies (5.0 mg/l) (U. S. EPA, 1976).

Table 2-1. Selected Water Quality Parameters for the Spokane River near Coeur d'Alene, Idaho (Concentration in mg/l)

Parameter	Mean	Range
Total phosphorus (P)[1,2]	.028	.010-.050
Orthophosphorus (P)[1,2]	.020	0-.040
Total nitrogen (N)[1,2]	.470	.160-.840
Total ammonia[1]	.003	0-.070
Unionized ammonia[1,4]	.001	0-.002
Nitrate + nitrite[1]	.012	0-.060
Cadmium[1,3]	.003	.001-.004
Lead[1,3]	.006	.002-.038
Zinc[1,3]	.245	.120-.581
Copper[1,3]	.001	0-.004
Arsenic[1]	.001	.001-.002
Mercury[1]	.001	0-.001
Chlorine		
BOD_5[1,2]	1.580	1.370-3.500
DO/% saturation[1,2]	10.1/96%	2.8/2.3%-11.3/108%
Fecal coliforms/100 ml[1,3]	20.2	0-133.0

[1]USGS Provisional Records (1980)
[2]Yearsley (1980)
[3]Funk, et al. (1975)
[4]Calculated from mean temperature and pH (Willingham, 1976)

Recent studies indicate there are low dissolved oxygen (DO) concentrations in the impounded portion of the river downstream from Coeur d'Alene (Yearsley, 1980). Under proposed water quality standard revisions, the DO criteria for the Spokane River will be 90 percent saturation during salmonid spawning and 7.0 mg/l daily average for other periods with the daily minimum not to fall below 6.0 mg/l. Mean DO concentrations and percent saturation do not meet these criteria during the summer months due to elevated temperatures and reduced stream flow (Yearsley, 1980). Percent saturation in deep pools upstream from Post Falls was as low as 33 percent during July 1980 and fell to 2.3 percent at certain downstream stations during August 1980. DO concentrations at these sites were reduced to less than 3.0 mg/l (Yearsley, 1980).

Nutrient input (phosphorus and nitrogen) more than any other factor is responsible for the nuisance algal problems in the Spokane River, including Long Lake (Soltero, 1979). Concentrations of phosphorus and nitrogen are generally low throughout the Spokane River from the outlet of Lake Coeur d'Alene to the Post Falls Dam (Yearsley, 1980). Total phosphorus, though at low concentrations, was substantially higher downstream from the Coeur d'Alene's waste treatment facility than it was upstream.

Concentration and load criteria for any water quality parameter have inherent limitations, especially in the area of nutrient effects on potential plant growth (Vollenweider, 1970). Bearing this in mind these criteria are the only acceptable methods available for assessing water quality impacts. Published criteria for prevention of nuisance algal growth in streams (Muller, 1953; Macenthun, 1967) suggest concentrations of 0.3 mg/l nitrate, 2.6 mg/l total ammonia and 0.6 mg/l for total nitrogen. Criteria for orthophosphorus range from .02-.05 mg/l (U. S. EPA, 1976). Contrary to these findings, the American Fisheries Society (1979) states that an attempt to establish single value critical concentrations is not in accord with the information presently available on the role of nitrogen and phosphorus in causing fertilization problems in water bodies.

Toxins present in the Spokane River which exceed EPA proposed water quality criteria include beryllium (>.053 μg/l), silver (>.009 μg/l), and arsenic (>.02 μg/l), primarily due to both industrial and municipal point source dischargers. Mercury levels (>.08 μg/l) are due only to industrial dischargers (U. S. EPA, 1980).

Impacts of the Proposed Waste Treatment Facility on Existing Water Quality

Water quality impact analysis was based on projected effluent concentrations, effluent discharge, and proposed outfall site of each alternative (no action, B, E, and G). Resultant concentration and load increases were calculated by dividing combined effluent and background river load by their respective total volumes. Effluent characteristics (Table 2-2) were provided by Brown and Caldwell and U. S. Geological Survey (USGS) effluent monitoring studies conducted at the existing Coeur d'Alene treatment plant. River volume data were obtained from USGS records on the Spokane River near Post Falls (1965-1979) as credible long-term data upstream from Post Falls were unavailable. A study is currently in progress monitoring river volume near Coeur d'Alene. At the present time, however, only two sets of measurements have been taken, one invalidated by extremely low current velocity (Jones, pers. comm.).

River volume in the immediate study area should not be significantly different than at Post Falls if diversions and groundwater losses are considered (Gudenberger, pers. comm.). Thus, mean and 7-day 10-year low flow (Q_{7-10} worse case basis) were calculated by totaling river volume at Post Falls, diversions for irrigation use in the Rathdrum Prairie Project (46 cfs) and water lost to groundwater (150 cfs) between Coeur d'Alene and Post Falls (Yearsley, 1980). Loading and concentration increases were tabulated seasonally (November-April [N-A], May-October [M-O]) as Alternative G proposes no discharge and Alternatives B and E propose reduced phosphorus effluent concentrations during the M-O period.

All three alternatives propose a 6 MGD effluent discharge by the year 2005 at different localities on the Spokane River. Disregarding outfall location, the resulting effect on water quality will be equivalent during the N-A period for all three plant alternatives. Concentration and load increases were thus incorporated into single tables (Tables 2-3 to 2-6); M-O increases are not applicable to Alternative G. As baseline water quality data were obtained downstream from the existing 2.2 MGD treatment plant at Coeur d'Alene, its effects must be considered in assessment of future impacts. Consequently, all three alternatives were evaluated as if a 3.8 MGD (6.0-2.2) effluent discharge were being proposed. This procedure makes two unavoidable assumptions: 1) the existing Coeur d'Alene treatment plant is operating at full capacity year-round, and 2) effluent characteristics at the existing plant will be equivalent to the proposed facilities in the three alternatives. Neither of these assumptions should significantly affect assessment of future impacts.

Table 2-2. Effluent Concentration and Loading for Each Proposed Alternative (Concentration in mg/l, Loading in lbs/day)

Parameter	Alternative B Concentration N-A[4]	Alternative B Concentration M-O[4]	Alternative B Load N-A	Alternative B Load M-O	Alternative E Concentration N-A	Alternative E Concentration M-O	Alternative E Load N-A	Alternative E Load M-O	Alternative G Concentration	Alternative G Load
Total phosphorus[2]	7	1.5	221.9	47.6	7	1.5	221.9	47.6	7	221.9
Orthophosphorus[2]	6.5	1.4	206.1	44.4	6.5	1.4	206.1	44.4	6.5	206.1
Total nitrogen[2]	20.0		634.0		20.0		634.0		20.0	634.0
Total ammonia[2]	13.5		428.0		13.5		428.0		13.5	428.0
Unionized ammonia[2,3]	.02	.03	0.6	1.0	.02	.03	0.6	1.0	.02	0.6
Nitrate + nitrite[1]	5.8		183.9		5.8		183.9		5.8	183.9
Cadmium[1]	<.005		0.2		<.005		0.2		<.005	0.2
Lead[1]	<.050		1.6		<.050		1.6		<.050	1.6
Zinc[1]	.293		9.3		.293		9.3		.293	9.3
Copper[1]	.035		1.1		.035		1.1		.035	1.1
Arsenic[1]	<.01		0.3		<.01		0.3		<.01	0.3
Mercury[1]	<.0005		0.02		<.0005		0.02		<.0005	0.02
Chlorine[2]	0.5		15.9		0.5		15.9		0.5	15.9
BOD_5[2]	15		475.5		15		475.5		30	951.0
Fecal coliforms/100 ml[2]	200		6,340		200		6,340		200	6,340

[1]IDHW (1980)
[2]Brown and Caldwell (1980)
[3]Calculated from mean effluent temperature and pH (Willingham, 1976)
[4]N-A = November-April, M-O = March-October

Table 2-3. Potential Concentration Increases (mg/l) Under Mean Flow Conditions of Selected Water Quality Parameters in the Spokane River near Coeur d'Alene, Idaho

Parameter	Mean Flow 7,352 cfs	Nov-Apr Increase	Percent Change	Mean Flow 6,446 cfs	May-Oct Increase	Percent Change
Total phosphorus (P)	.028	.034	21.4	.028	.029	3.6
Orthophosphorus (P)	.020	.025	25.0	.020	.021	5.0
Total nitrogen (N)	.470	.486	3.4	.470	.488	3.8
Total ammonia	.003	.014	366,7	.003	.015	400.0
Unionized ammonia	.001	.001	Trace	.001	.001	Trace
Nitrate/nitrite	.012	.017	41.7	.012	.017	41.7
Cadmium	.003	.003	Trace	.003	.003	Trace
Lead	.006	.006	Trace	.006	.006	Trace
Zinc	.245	.245	Trace	.245	.245	Trace
Copper	.001	.001	Trace	.001	.001	Trace
Arsenic	.001	.001	Trace	.001	.001	Trace
Mercury	.001	.001	Trace	.001	.001	Trace
Chlorine		.001			Trace	Trace
BOD_5 (Alt. B&E)	1.580	1.591	0.7	1.580	1.591	0.7
BOD_5 (Alt. G)	1.580	1.603	1.5	1.580*	1.580	0.0
Fecal coliforms/100 ml	20.2	20.3	0.5	20.2	20.4	1.0

*No summer discharge

Table 2-4. Potential Concentration Increases (mg/l) under Q_{7-10} Flow Conditions of Selected Water Quality Parameters in the Spokane River near Coeur d'Alene, Idaho

Parameter	Q_{7-10} Flow 1,564 cfs	Nov-Apr Increase	Percent Change	Q_{7-10} Flow 309 cfs	May-Oct Increase	Percent Change
Total phosphorus (P)	.028	.054	92.3	0.28	.055	96.4
Orthophosphorus (P)	.020	.044	110.0	.020	.046	130.0
Total nitrogen (N)	.470	.543	15.5	.470	.835	77.7
Total ammonia	.003	.054	1,700.0	.003	.255	8,400.0
Unionized ammonia	.001	.001	Trace	.001	.002	100.0
Nitrate/nitrite	.012	.034	183.3	.012	.120	900.0
Cadmium	.003	.003	Trace	.003	.003	Trace
Lead	.006	.006	Trace	.006	.007	16.7
Zinc	.245	.245	Trace	.245	.246	0.4
Copper	.001	.001	Trace	.001	.002	100.0
Arsenic	.001	.001	Trace	.001	.001	Trace
Mercury	.001	.001	Trace	.001	.001	Trace
Chlorine		.002			.009	
BOD_5 (Alt. B&E)	1.580	1.630	3.2	1.580	1.831	15.9
BOD_5 (Alt. G)	1.580	1.686	6.7	1.580*	1.580	0.0
Fecal coliforms/100 ml	20.2	20.9	3.5	20.2	23.6	16.8

*No summer discharge

Table 2-5. Potential Load Increases (lbs/day) Under Mean Flow Conditions of Selected Water Quality Parameters in the Spokane River near Coeur d'Alene, Idaho

Parameter	Mean Flow 7,352 cfs	Nov-Apr Increase	Percent Change	Mean Flow 6,446 cfs	May-Oct Increase	Percent Change
Total phosphorus (P)	1,109.6	1,331.5	20.0	972.8	1,020.4	4.9
Orthophosphorus (P)	792.5	998.6	26.0	694.9	739.3	6.4
Total nitrogen (N)	18,624.8	19,258.8	3.4	16,329.6	16,963.6	3.9
Total ammonia	118.9	546.9	360.0	104.2	532.2	410.7
Unionized ammonia	39.6	40.2	1.5	34.7	35.7	2.9
Nitrate/nitrite	475.5	659.4	38.7	416.9	600.8	44.1
Cadmium	118.9	119.1	0.2	104.2	104.4	0.2
Lead	237.8	239.4	0.7	208.5	210.1	0.8
Zinc	9,708.7	9,718.0	0.1	8,512.3	8,521.6	0.1
Copper	39.6	40.7	2.8	34.7	35.8	2.9
Arsenic	39.6	39.9	0.8	34.7	40.0	0.9
Mercury	39.6	39.62	0.1	34.7	34.72	0.1
Chlorine	0.0	15.9		0.0	15.9	
BOD_5 (Alt. B&E)	62,611.1	63,086.6	0.8	54,855.4	55,330.9	0.9
BOD_5 (Alt. G)	62,611.1	63,562.1	1.5	54,855.4*	54,855.4	0.0

*No summer discharge

Table 2-6. Potential Load Increases (lbs/day) Under Q_{7-10} Flow Conditions of Selected Water Quality Parameters in the Spokane River Near Coeur d'Alene, Idaho

Parameter	Q_{7-10} Flow 1,564 cfs	Nov-Apr Increase	Percent Change	Q_{7-10} Flow 309 cfs	May-Oct Increase	Percent Change
Total phosphorus (P)	236.0	457.9	94.0	46.6	94.2	102.1
Orthophosphorus (P)	168.6	374.7	122.4	33.3	77.7	133.3
Total nitrogen (N)	3,962.1	4,596.1	16.0	782.8	1,416.8	81.0
Total ammonia	25.3	453.3	1,691.7	5.0	433.0	8,560.0
Unionized ammonia	8.4	9.0	5.0	1.7	2.7	58.8
Nitrate/nitrite	101.2	285.1	181.7	20.0	203.9	919.5
Cadmium	25.3	25.5	0.8	5.0	5.2	4.0
Lead	50.6	52.2	3.2	10.0	11.6	16.0
Zinc	2,065.4	2,074.7	0.5	408.0	417.3	2.3
Copper	8.4	9.5	13.1	1.7	2.8	64.7
Arsenic	8.4	8.7	3.6	1.7	2.0	17.6
Mercury	8.4	8.42	0.2	1.7	1.72	1.2
Chlorine		15.9			15.9	
BOD_5 (Alt. B&E)	13,319.4	13,794.9	3.6	2,631.5	3,107.0	18.1
BOD_5 (Alt. G)	13,319.4	14,270.4	7.1	2,631.5*	2,631.5	0.0

*No summer discharge

No-Action Alternative. This alternative proposes the continued operation of the existing waste treatment plant at Coeur d'Alene. Thus, existing water quality conditions (Table 2-1) would continue if the current level of wastewater treatment efficiency is maintained. The plant is currently meeting all NPDES requirements except for concentrations of suspended solids. Recent investigations indicate, however, that the deterioration of the physical plant structures due to aging and influent volume beyond present capacity during wet weather conditions will result in future degradation of water quality. A pulse of untreated waste due to treatment plant capacity exceedence imposes additional stress on aquatic life over and above the effects of reduced water quality. The continued operation of this facility would create the possibility of adverse effects, increasing with time, on fish productivity and domestic water use, while increasing the possibility of nuisance plant growth.

Alternative B. Alternative B proposes expanding the existing plant at Coeur d'Alene from its present capacity to 6 MGD, along with phosphorus removal during the M-O period.

Nutrient Increases - Phosphorus. Orthophosphate (inorganic soluble) is the most important parameter in reference to increased primary productivity. Total phosphorus is converted to orthophosphate by various biological pathways, hence both are indicators of algal growth potential. Total and orthophosphorus mean flow concentration and load increases are 20-25 percent during the N-A period and less than 5 percent during the M-O period (Tables 2-3 and 2-5). The latter represents the months of highest algal growth potential due primarily to increased sunlight and elevated temperatures. Algal composition during this period is dominated by long strands of the filamentous algae (Ulothrix sp., Cladocera sp.) which carpet the bottom, thereby reducing aesthetic appeal in the river. Species present during the remainder of the year consist primarily of epiphytic and epiletic diatoms which are not as detractive as the summer periphyton growth. Funk (1976) reports that late October 1971 populations consisted mainly of the diatom Tabellaria fenestrata. The diatom, Melosira italica dominated from mid-winter to early summer in 1972, with smaller populations of Fragilaria sp. and Tabellaria fenestra primarily restricted to pools. In late summer and early fall the blue greens Aphanizomenon flos-aquae and Oscillatoria sp. appeared along with the diatoms Fragillaria sp., Melosira italica, and a yellow-green algae, Tribonema sp.

These algal species, present during the more critical M-O period, would only experience a 5 percent increase in phosphorus over existing low concentrations. One factor indicative of algal growth potential is a determination that a certain algal species growth is limited by a particular nutrient. The low inorganic nitrogen to orthophosphate ratio (about 2:1) suggests that increased nitrogen might stimulate algal growth. In the study area, however, concentrations of both nitrogen and orthophosphate are low. Under these conditions, increased orthophosphate may stimulate algal growth. The effects would be a localized fertilization of algae below the treatment plant outfall and for a distance downstream. The potential for increased algal growth below the outfall is highest during late summer prior to fall turnover of Lake Coeur d'Alene. Phosphorus concentrations are low at this time. The increase in phosphorus concentrations under Q_{7-10} conditions (Table 2-4) indicate that enhanced algal production below the outfall and for a distance downstream is highly probable.

Algal growth approaching nuisance levels has the highest probability of occurrence in slow moving or impounded waters (Hynes, 1970). Total phosphorus and orthophosphate loading to a water body is a more indicative factor of long-term effects than concentration increases (Vollenweider, 1970). Under mean flow conditions, total phosphorus and orthophosphate would be discharged at a rate of 2,200 pounds per day. Currently the Washington Department of Ecology (DOE) is conducting an extensive waste allocation study on the Spokane River. Results will provide clear guidelines for maximum allowable nutrient loading to the river based on plant flow, season, and/or stream flow. Upon completion of this study an ultimate determination can be made of the potential effects of projected nutrient loads under Alternative B.

Nitrogen Increases. The inorganic nitrogen compounds ammonia, nitrate, and nitrite are the most biologically significant of the nitrogenous effluent components (Hynes, 1970). Nitrate is generally regarded as the most available form of inorganic nitrogen for algal growth (Wetzel, 1975) although Flagg and Reid (1954) found that at concentrations less than 15 mg/l there was no significant difference in the utilization of the three nitrogen forms by stream algae.

Total nitrogen concentration increases during the M-O period under mean flow conditions are less than 4 percent. The limited concentration increase may not preclude an increase in primary productivity below the outfall, as nitrogen may also be in such low concentrations as to be growth limiting. Evaluation of any nutrient increases are complicated by the possible presence of substances inhibiting algal growth such as zinc (Yearsley, 1980; Funk, et al., 1975). A localized fertilization effect below the outfall is most probable during the low flow late summer months.

Nitrate/nitrite concentrations increased about 42 percent under mean flow conditions during the M-O period. The resultant concentration (Table 2-3) is below established criteria for protection of nuisance algal growth in streams. This reflects the low background river concentrations. Total ammonia concentrations substantially increase under mean flow conditions (367 percent). The actual resultant concentration, however, is very low (0.01 mg/l), again indicating low river concentrations.

Downstream effects on standing waters can only be conclusively assessed upon the completion of the DOE waste allocation study discussed above. Load increases under mean flow conditions during the M-O period will be 634 pounds per day total nitrogen, 428 pounds per day total ammonia, and 184 pounds per day nitrate/nitrite (Table 2-5).

Dissolved Oxygen Decreases. The impact of the Alternative B effluent discharge on DO concentrations depends primarily on the deoxygenation rates and reaeration rates of the river. At present, there are few data on these parameters in the Spokane River between Coeur d'Alene and Post Falls. The BOD_5 and total ammonia components of the effluent are the most important factors affecting the deoxygenation rate. BOD_5 represents the measure of the quantity of DO necessary for decomposition of organic matter by micro-organisms such as bacteria. Under aerobic conditions, ammonia is readily oxidized to nitrate (NO_2), which is then oxidized to nitrate (NO_3). The rate at which ammonia is oxidized to nitrite and ultimately nitrate depends upon environmental conditions. Unlike carbonaceous BOD_5, which is generally oxidized by a spectrum of heterotrophic bacteria in the water column, ammonia is oxidized by a few specialized genera of bacteria. These nitrifiers typically are attached to some substrate. Therefore, nitrification rate is a function of river bottom area, water volume ratios, and substrate type. On the other hand, the reaeration rate is affected by river depth, current velocity, and other miscellaneous factors such as wind action.

The increase in BOD_5 during the more critical M-O period, when higher water temperatures mean reduced DO concentrations, is about 1 percent and only 16 percent under Q_{7-10} conditions, (Table 2-4). Thus, oxidizable material contained in the proportionally low volume discharge is highly diluted by the high volume of the Spokane River. Total ammonia concentrations under mean flow conditions increase over 400 percent but only to .015 mg/l. The reaeration rate will be highly influenced by the rate of flow out of the impounded area of Post Falls. Current uncertainty as to these critical parameters precludes a complete analysis of adverse impacts.

Increases in mean BOD_5 loading during the M-O period are 476 pounds per day. Mean ammonia loading increases during the M-O period are 428 pounds per day and nitrate/nitrite loading increases are 184 pounds per day (Table 2-3). Based on all available data, the resultant load increases should not significantly affect DO concentrations in flowing waters. However, during the low flow summer months, DO concentrations in areas of minimal water circulation (e.g., deep pools) could decrease below the already low existing concentrations.

Heavy Metals and Toxins. Year-round concentration increases for all metals and toxins under mean flow conditions are in trace (<.0005 mg/l) amounts, undetectable by conventional laboratory analysis. The ramifications of metal and toxin increases will be discussed in the fisheries section.

Alternative E. This alternative proposes a 6 MGD discharge with seasonal phosphorus removal as does Alternative B, hence the concentration and load increases are equivalent (Tables 2-3 to 2-6). The fundamental difference between alternatives is the location of the effluent outfall. The three sites selected for Alternative E are about 1 mile and 2 miles, respectively, downstream from the outfall site of Alternative B.

Nutrient Increases. Potential localized fertilization effects will be similar to those discussed previously for Alternative B as long as there are no significant differences in substrate characteristics below the outfalls. The effects on downstream areas of slow moving or standing water may be different due to the closer proximity of Alternative E.

The retention time for nutrients would be less as the distance between the point of discharge and outflow from the impounded area at Post Falls is decreased. This reduced distance would allow nutrients to "leave the system" quickly, thereby mitigating any adverse effects on areas of slow moving or still water. Conversely, the reduced exposure period means there is a decreased possibility of nutrients being eliminated or rendered inert by various biological processes.

Dissolved Oxygen Decreases. The decreased retention time of Alternative E results in diminished dilution of BOD_5 and total ammonia loads. Any subsequent effects on DO concentrations would be most apparent during the summer low flow periods. Current velocity and depth measurements upstream from the Alternative E sites indicate that waters reaching the impoundment at Post Falls will undergo a higher degree of reaeration if discharged at the Alternative B site. Conversely, a decreased retention time means oxidizable matter will be transported out of the Post Falls impoundment area faster, thus utilizing oxygen further downstream where oxygen depressions are not as acute.

Heavy Metals and Toxins. Placement of the outfall site further downstream in Alternative E reduces the chance of effluent encounter by game fish migrating out of Lake Coeur d'Alene. The potential for adverse effects is increased if game species are spawning in the upper reaches of the river, as younger fish are generally more susceptible to metals and toxins. These points will be further discussed in the fisheries section.

Alternative G. Alternative G provides for no additional discharge above existing levels during the M-O period. The absence of summer and fall discharge increases (except the existing 2.2 MGD discharge) eliminates any adverse effects that would be created by Alternatives B and E discussed above. There is no additional possibility of summertime nuisance algal growth both instream and at slow moving or standing water sites downstream. Deoxygenation of downstream areas will not increase in severity nor will game fish productivity be reduced below present levels. The absence of summer discharge makes this alternative the most attractive from a water quality perspective.

The 3.8 MGD discharge site during the N-A period is located in the vicinity of the Alternative E outfall; thus, effects on water quality will be similar but not equivalent. A different treatment process is proposed which will increase BOD_5 loading 100 percent over Alternatives B and E. This additional input will increase concentrations 1.5 percent under mean flow conditions and 6.7 percent under Q_{7-10} conditions. The slight addition to existing river concentrations will not be measurable with the current accuracy of BOD_5 analysis and should not create a significantly greater adverse impact than the previous two alternatives.

Mitigation Measures

All proposed alternatives should utilize a diffused outfall that reduces localized water quality problems. A variety of other water quality-related mitigation measures are suggested in the fisheries and beneficial river uses sections of this chapter.

Effects of Surface Water Quality Changes on River Uses

Introduction

A wide range of "beneficial uses" have been identified on the Spokane River, from the mouth of the river to the Idaho/Washington State border. The most important water quality dependent uses are recreational, economic and aesthetic.

The following pages describe existing river uses. How these beneficial uses would be affected by different alternatives of the proposed project are discussed later, based primarily on interviews with individuals representing the various uses. Figure 2-1 graphs beneficial uses in relation to Spokane River flows and wastewater dilution potential.

Existing Recreation Uses

Water Contact Recreation.

Swimming and Waterskiing. Swimming and waterskiing are both popular recreational pursuits for locals and out-of-state enthusiasts on this stretch of the river. A few brave the cold waters in wet suits to extend the season, but most activity occurs in the warmer summer months, June through September. The entire length of this stretch is used for waterskiing; it becomes crowded at peak times, particularly around Harbor Island and Greenberry Bay (Anderson, pers. comm.). Corbin Park, Post Falls Park, and the NIC beaches are the main swimming areas, the latter having 3,000-4,000 people per day in the summer (Clegg, pers. comm.). There are two church camps situated on the river, the Baptist Church Camp and Millwood Presbyterian Church Camp. The Baptist Camp had 1,300 children and 1,400 adults staying between January and September 1980, many of whom swam near Black Bay (Baptist Church, pers. comm.). The Presbyterian Camp has 100 children per month who swim in the river from May through September.

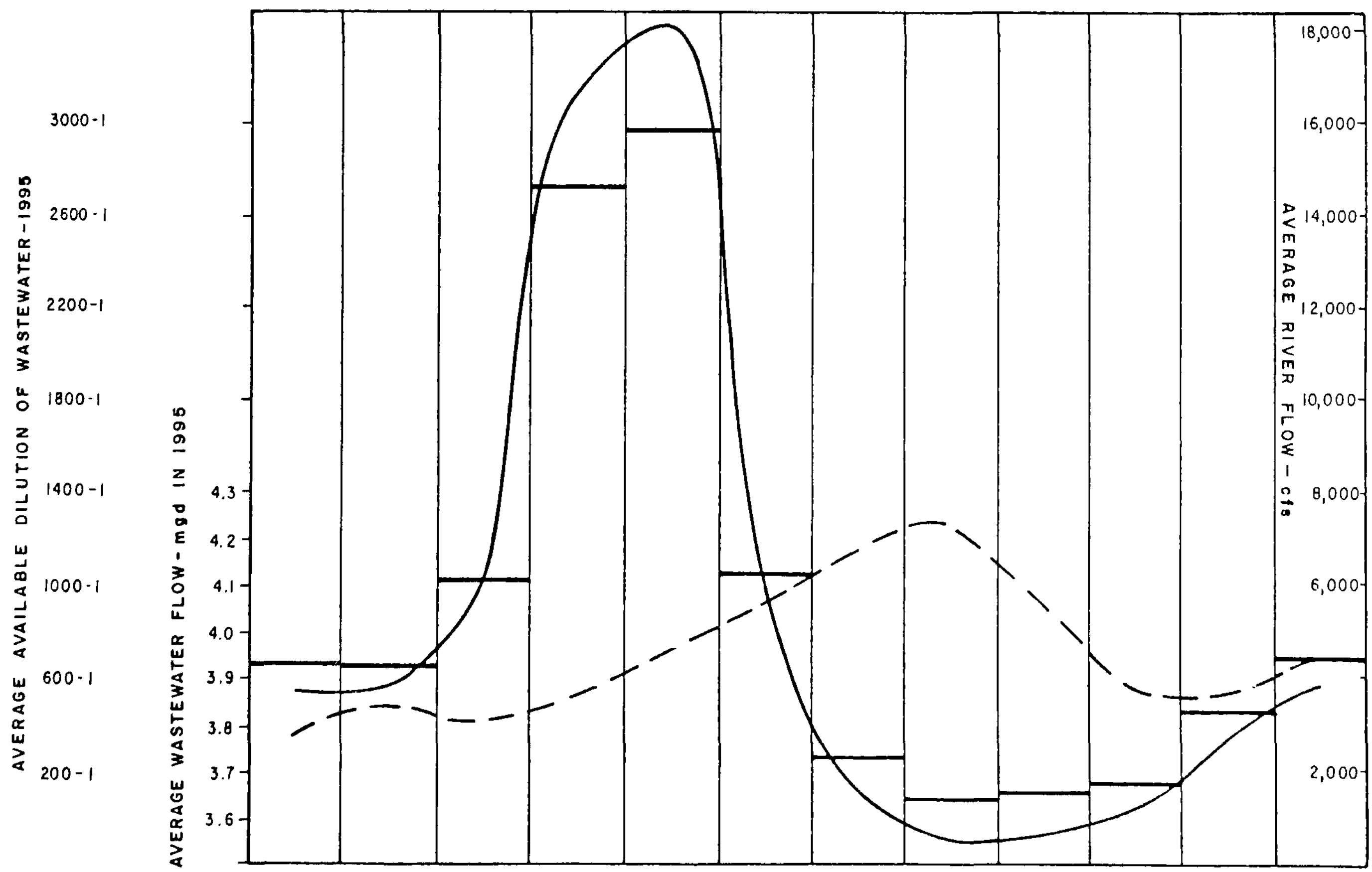
Scuba Diving. In Coeur d'Alene there is a scuba school with an annual enrollment of 150 students. Because of poor visibility, however, only a handful of divers use the river. The only areas of interest are under the bridges at Post Falls, Coeur d'Alene, and around the marinas (Lee, pers. comm.).

Figure 2-1

RELATIONSHIP BETWEEN SPOKANE RIVER BENEFICIAL USES & AVERAGE AVAILABLE DILUTION OF WASTEWATER DISCHARGES TO THE RIVER

RIVER USES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
SWIMMING, SKIING					– –	——	——	——	– –			
RAFTING, KAYAKING	– –	– –	——	——	——	——	——	——	– –	– –	– –	– –
SCUBA DIVING	– –	– –	– –	– –	——	——	——	——	——	– –	– –	– –
BOATING			– –	– –	——	——	——	——	– –	– –	– –	
FISHING	– –	– –	– –	——	——	——	——	– –	– –	– –	– –	– –
HUNTING										——	——	——
CAMPING, PICNICKING				– –	– –	——	——	——	– –	– –		
BIRD WATCHING	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –
LOG TRANSPORT	– –	– –	– –	– –	– –	——	——	——	——	– –	– –	– –
IRRIGATION					——	——	——	——	——			
POWER GENERATION	——	——	——	——	——	——	——	——	——	——	——	——
WATER SUPPLY	——	——	——	——	——	——	——	——	——	——	——	——

- LEGEND - – – INDICATES INTERMITTENT USE —— INDICATES FREQUENT USE



- LEGEND -
DILUTION RATIO
AVERAGE RIVER FLOWS
ESTIMATED AVERAGE WASTEWATER FLOWS - 1995

Rafting, Canoeing, and Kayaking. Canoeing and kayaking enthusiasts use this stretch of the river throughout the year, with most activity occurring between March and August. Two organizations, the Spokane Canoe Club and the North Idaho White Water Association (NIWWA), provide most of the use; the latter club has 35 members (Mossman, pers. comm.). The river provides ideal conditions for canoeing, particularly between Post Falls and Sullivan Road (several miles west of the Idaho/Washington border). Along this stretch, Spokane Canoe Club holds an annual event usually attracting 100 competitors. The Baptist Church Camp also provides canoes for use near Black Bay. From Corbin Park downstream, raft races are held in the summer and people have fun inner tubing.

On-Water Recreation.

Boating. Boating is becoming increasingly popular in this area. Approximately 1,000 boats are found on the water between Post Falls and Coeur d'Alene. Of these, 600 are usually moored (Clegg, pers. comm.). A large number of houses have private moorings and there are two marinas, one at the mouth of the river and one at a new condominium complex at Post Falls (Anderson, pers. comm.).

The most popular area for boating is near Post Falls Park, where boats are launched for pleasure cruising. On summer weekends, this stretch of river is often crowded and bustling with activity. Sailing is limited by the physical constraints of the river channel and, although Spokane Yacht Club is situated on the river, most sailing occurs on the lake. During the first few months of the year, one finds a few fishing boats at the mouth of the river.

Ice Skating. Between December and February, when the river freezes, a few people skate in the sheltered bays.

Duck Hunting. Duck hunting is of little importance on most of the river, and there are no hunting clubs located in the area. The only activity, averaging 25-50 man days, occurs late in the season when mallards are hunted near Post Falls Dam (Miller, pers. comm.).

Fishing. Largemouth bass, yellow perch, black crappie and pumpkinseed are fished throughout the year. This fishing is incidental compared to seasonal fishing for cutthroat trout from May to June and kokanee salmon from April to July. From the mouth of the lake to Post Falls Dam, an estimated 1,000 angler days per year have been recorded, of which 200 are used in the first weekend of the season (Goodnight, pers. comm.). The estimate from Post Falls Dam to the state line is 500 angler days per year.

Shoreline Activities.

Camping and Picnicking. Although there are a number of possible camp sites along the river shore, camping is restricted to the two church camps, the Baptist Foundation Camp and Millwood Presbyterian Camp. The latter covers an area of 25 acres and is visited by 100 people per month during the summer. Between January and September 1980, the Baptist Foundation Camp accommodated 1,300 children and 1,400 adults.

There are numerous picnicking sites, all of which are well used. In Post Falls 22,111 people visited Post Falls Park between July 10 and August 5, 1978 (Harmon, pers. comm.). Many benefited from the park's picnicking facilities. At Corbin Park, picnic tables and barbecues are provided. In the summer, approximately 25 people visit each weekend. During the rest of the year, this declines to 10 people per weekend (Eachon, pers. comm.). NIC is another popular picnicking site. It is visited by 3,000-4,000 people a day in the summer (Clegg, pers. comm.). There are plans to upgrade the facilities near the college; this will lead to more use in the future (Kootenai County Planning Commission, 1977).

Bird Watching. This stretch of river has a wealth of bird life. The Audubon Society visits the area once a year in late fall and an eagle census has been conducted from the lake to the stateline as part of the 1979 national count. Eagles are present in the winter but no nests have been identified. There are osprey nests on pilings at the lake outlet near Post Falls and downstream from Blackwell Island. Common bird species found along the river include: mergansers, wood ducks, mallards, and Hungarian partridge (Sturts, pers. comm.).

Economic Uses

Water Withdrawal.

Agriculture and Industry. Industrial water withdrawals are negligible. The main industry along the river is log milling. This industry uses water for processing, for steam generation in boilers, and for fire protection. Fire protection is the only use in which water is withdrawn directly from the river. The other uses require good quality, sediment-free water which is obtained from the city water supply and wells (Diamond International, pers. comm.).

The major agricultural withdrawal is by Post Falls Irrigation District (PFID), which draws water directly from the river using a pump just north of Harbor Island. The water is used to irrigate approximately 3,000 acres of grass, beans, and peas from May to September. Recent withdrawals are listed in Table 2-7.

The difference between the value for extraction and the amount delivered is a result of evaporation and leakage from the irrigation system (Jaeger, pers. comm.). There are two other minor agricultural withdrawals. Jacklin Seed diverts enough water to irrigate approximately 80 acres of land at Holland Park (Jacklin, pers. comm.). A smaller withdrawal to irrigate 40 acres occurs upstream from Post Falls (Beck, pers. comm.).

Domestic Consumption. A comprehensive survey of the Spokane River shoreline carried out by the PHD has identified residents who use river water for domestic and utility consumption. Two hundred and seventy-nine primary plots were surveyed and it was determined that 59 percent of the domestic water used for utilities and drinking water was withdrawn directly from the river. The study region has been subdivided into three areas below for more detail:

River Stretch	Percent of Residents Using River for Domestic Water	Number of Households Using River for Domestic Water
Mouth to Post Falls Dam	69	129
Post Falls Dam to Stateline	27	10
Harbor Island	45	25

SOURCE: PHD, 1977.

Power Generation. The WWP diverts water from the Spokane River to generate power. Maximum power production is about 13,000 kw (Clegg, pers. comm.). Flows through the plant vary considerably, with a self-imposed minimum flow of 300 cfs to minimize wastewater-related river quality problems downstream in Washington. The average regulated flows through Post Falls Dam are summarized in Table 2-8.

Table 2-7. Post Falls Irrigation District River Withdrawals

	Irrigated Acreage	Feet Per Acre Pumped From River	Feet Per Acre Delivered	Acre-feet Drawn From River
1978	2,268	3.9	2.7	8,845
1979	2,950	4.4	3.3	12,980

SOURCE: Modified from: Jaeger, pers. comm.

Table 2-8. Spokane River at Post Falls - Average Monthly Flows in Cubic Feet per Second

Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1,650	670	750	1,010	2,490	3,920	3,870	3,910	5,930	16,530	18,030	6,87

SOURCE Clegg, pers. comm.

Groundwater Recharge. The Spokane River recharges the Spokane Valley-Rathdrum Prairie aquifer between Post Falls and Greenacres, Washington at an average rate of 80 cfs (Drost and Seitz, 1978). Therefore, surface waters of the Spokane River contribute to the underground drinking water supplies of the residents of the Spokane, Washington area. Any changes in water quality of the river would affect the quality of the aquifer.

Navigation and Transportation. The river is used as a major transportation artery for moving logs from the mouth of the river to Post Falls. One hundred million board feet of logs are moved downstream each year (Haglund, pers. comm.). Most of the movement occurs in the summer, but it is a year-round operation, limited only by ice. Logs are stored in the river periodically near Huetter, Gibbs and Blackwell Island.

Proposed Commercial Development. A new marina and business complex is proposed bordering the treatment plant to the north and the west. The site will have three large office buildings, a condominium complex and an 86-berth marina with a proposed restaurant. A new development is also proposed across the river from the Coeur d'Alene treatment plant. This would consist of protected open space, condominiums, a motor hotel, specialty shops and offices with water access.

Impacts of Surface Water Quality Changes

A description of the waste discharge changes that would occur for each alternative is given below. This is followed by a description of the impacts of these changes on the beneficial uses of the Spokane River.

Changes Resulting From Each Alternative.

No Action.

1. Present wastewater treatment capacity of 2.5 MGD would be maintained.

2. The existing plant would continue to contribute to bacteria and viral counts in the river.

3. Under extreme conditions, for example when spring rains combine with snowmelt, the existing capacity would be insufficient, resulting in occasional overflow events.

Alternative B.

1. Increases treatment capacity to 6.0 MGD. This would occur in two stages. By 1985 the capacity would be 4.2 MGD; this would be increased to 6.0 MGD by the year 1995. This would result in increased discharge to the river.

2. Increased reliability of treatment would result from increasing plant capacity and improving existing facilities.

3. An improved outfall diffuser system would give a better initial dilution to the wastewater.

4. The discharge would be located near a proposed marina.

5. Most of the phosphorus in the wastewater would be removed during the summer.

Alternative E.

1. Increases treatment capacity to 6.0 MGD, resulting in increased discharge to the river.

2. Increased reliability of treatment, as a result of increased capacity and replacement of old equipment.

3. Site of new plant would be located closer to the majority of people who extract water directly from the river for domestic use. This location allows less time for the wastes to be diluted before reaching domestic water intakes.

4. Site of new plant would be located further downstream, thereby improving the river's water quality from the present discharge point to the new site.

5. Most of the phosphorus in the wastewater would be removed during the summer.

Alternative G.

1. No increase in present wastewater discharge during the summer. Winter discharge would eventually reach 6.0 MGD, with two points of discharge; a 2.2 MGD discharge from the existing site and a 3.8 MGD discharge 1 mile downstream.

2. Phosphorus removal would occur during the summer.

Impacts on Recreational Uses.

To pursue recreational activities, the river water must conform to three general conditions.

1. It must be reasonably free from pathogenic organisms.

2. It must contain no toxic substances which would lead to a health problem.

3. It must be aesthetically enjoyable.

The standard for these conditions depends on the type of recreational use. For contact recreation (including swimming, waterskiing, and scuba diving) stricter standards are required than for shoreline activities (including camping, picnicking and birdwatching).

Each general condition will be described and its impacts on the different alternatives will be discussed.

Pathogenic Organisms. Contamination of water by pathogenic organisms is normally monitored by testing for the presence of fecal coliform bacteria. High levels indicate the potential for a significant health hazard.

In Idaho, the water quality standard for contact recreation is a monthly geometric mean of 50/100 ml fecal coliforms, based on a minimum of five samples taken over a 30-day period from May 1 to September 30. For noncontact recreation the standards are less stringent, being 200/100 ml under the same conditions (IDHW, pers. comm.). The present mean coliform value in the Spokane River from May to October is 20.4/100 ml. This mean is expected to increase to 23.6/100 ml during Q_{7-10} flow conditions under all of the action alternatives. Although the mean given is below the standard, on many days the count does exceed the standard. Values as high as 133/100 ml have been recorded and the situation is thought to be getting worse (Funk, et al., 1975). The highest counts have been recorded near the present Coeur d'Alene treatment plant. As the water moves downstream, wastes become more dilute and the coliform count drops. Under the "no action" alternative, the following impacts are expected:

1. No significant increase in the discharge of pathogenic organisms would occur.

2. Swimming and scuba diving in the immediate area and downstream would continue to be discouraged.

Under Alternatives B and E the following impacts are expected:

1. With an increased discharge, the fecal coliform counts would increase.

2. Increased bacterial counts would be greatest during the busy recreational summer months, when the river flow is low and less dilution is available.

3. Swimming and waterskiing near the outfalls would be discouraged; a gradual decline in recreational use downstream could occur as the water quality deteriorates.

Under Alternative G, the following impacts are expected:

1. No significant increase in the discharge of pathogenic organisms would occur in the heavy recreation use period.

Toxic Substances. There is little evidence that toxic substances currently have a detrimental effect on Spokane River uses. Levels of pesticides, heavy metals, and other organic compounds have not been recorded in excess of recreational standards, even under Q_{7-10} flow conditions. High concentrations of zinc, however, are apparent, and have harmful affects on fish (see fish section). No other recreational activities are known to be affected by toxic substances and this situation should not be changed by the different alternatives.

Aesthetics. Water quality conditions that can affect aesthetics enjoyment are visible floating objects, suspended solids, sludge banks, slime infestations, heavy growth of plants, algal blooms and reduced water clarity from excessive sewage.

For contact recreation, the water should be free of debris, have no unpleasant odors, color or taste, and have limited algal growth and good water clarity.

Floating debris is found in the river. This is primarily from logging operations along the river from Coeur d'Alene to Post Falls. Although this influences contact recreation, it is not directly related to the sewage treatment plant. No problem of odor, color, or taste has been recorded. The water clarity has been measured by the secchi disk method. The results show that the water is fairly clear. However, a discussion with a scuba diver in the area emphasized that at certain times visibility was low. This is related in part to logging activities and the sewage treatment plant.

The main aesthetic effect on boating is algal growth. Algae can grow on the bottom of boats, and aquatic weeds can fill bays, restricting their use. As the concentration of nitrogen and phosphorus in the water increases, growth is stimulated. Tests taken of the Spokane River indicate that it is moderately productive based on a productivity classification linked to the 14-day standing crop of S. capricornutum by Miller, Maloney and Green, 1974 (Miller, et al., 1975). Equisetum, slimes, and diatoms are the species which predominate. They are found in highest concentration in the summer, when the nutrient levels are highest, near the sewage treatment outfall. There have been occasions when algal growth has affected boating; however, a number of variables are involved and it is difficult to conclude whether this is a result of the sewage outfall alone.

Fish distribution is greatly affected by the presence of nutrients, which stimulate primary productivity. Near the outfall, where the water temperatures are slightly higher and the water is nutrient-rich, some fish species congregate to feed. This is beneficial to fishermen seeking those species.

The "no action" alternative should not have a significant effect on the river's aesthetic value, unless discharges of poorly treated or untreated wastes increase as treatment equipment deteriorates. The various contact and noncontact recreational uses should therefore not be significantly affected.

The action alternatives (B, E, and G) would increase the volume of waste discharged to the river and Alternatives E and G would relocate portions of the discharge. Even though phosphorus removal would be used, increased algal production should result. Changes in water clarity may discourage some contact and noncontact recreational uses (swimming, waterskiing, boating) and the relocation of the outfall farther downstream under Alternative E may cause contact recreational activities to relocate in response to this change.

Aesthetic enjoyment is also important for other recreational uses mentioned, including picnicking, camping, birdwatching, duck hunting, and ice skating. It is thought that the impact on these uses from the different alternatives will be negligible.

Impacts on Economic Uses. There are five economic uses of the river that will be affected by the wastewater facilities alternatives:

1. Agricultural water.

2. Domestic water.

3. Groundwater recharge.

4. Proposed commercial development.

5. Industry, power generation, navigation and transport.

Agricultural Water. Water extracted from the river for agricultural use is used entirely for irrigation. In any discussion on the quality of water for irrigation, it is necessary to consider how the constituents affect both the soil and the plants grown. Many variables influence these parameters including, salinity, sodium content, and toxic metal concentration. Although there would be a slight increase in nutrients, which would influence plant growth, there are no other elements in the wastewater likely to alter the irrigation use of the water. Alternative E is situated nearest to the PFID extraction and would be the only alternative likely to have any impact. This is thought to be minimal.

Domestic Water. The use of water for drinking and other domestic purposes requires the highest degree of sanitary protection. To determine a suitable standard, three aspects are considered:

1. Bacterial quality, which includes fecal coliform levels.

2. Physical characteristics, including color and clarity.

3. Chemical characteristics, particularly heavy metal concentrations.

Under present conditions, the levels of heavy metals pose no problem. Similarly, physical characteristics are acceptable. Fecal coliform counts, however, often exceed the drinking water standards. This is of particular importance considering the number of people extracting drinking water directly from the river.

The "no action" alternative should not alter current drinking water quality. Alternatives B, E, and G would increase the discharge of pathogenic agents and increase algal levels in the river. Both of these factors are of concern to those drawing drinking water directly from the river. This is especially true under summer low flow conditions when dilution potential is at its lowest point and algal growth potential is at its highest.

The increased discharge under Alternative B would still have considerable time for dilution and natural die-off before it reaches most domestic users around Harbor Island and farther downstream. Alternative E would move the discharge 1-2 miles closer to these domestic users. The potential for a contamination of drinking water would therefore be much greater, especially if treatment malfunctions or wastewater bypasses were to occur. The increased waste flow under Alternative G would occur in the winter months when river flows are higher, so the contamination potential would be less than under Alternative E.

Groundwater Recharge. If the potability of Spokane River surface waters is degraded by the various project alternatives, a similar impact could be expected on drinking water extracted from the Rathdrum Prairie aquifer downstream from Post Falls. As mentioned earlier, the river recharges the aquifer at a rate of 80 cfs between Post Falls and Greenacres, Washington. With wastewater disinfection and dilution in the surface and subsurface flows, the pathogenic organism content of major water supply wells in Washington should not be affected. Rural domestic well extractions in the Post Falls area could be affected, however, especially if treatment plant bypasses or malfunctions occur. This potential contamination, however, is much less significant than the surface water contamination problem. Alternative E would pose the biggest threat because its discharge is farther downstream and therefore closer to the zone of groundwater recharge.

Proposed Commercial Development. A marina and residential/commercial development has been proposed for construction adjacent to the site of the present Coeur d'Alene treatment plant. Its construction will be influenced by the wastewater alternative taken.

Under Alternative G and "no action" the plans for development should not be altered from present conditions. If the plant was moved down river, as proposed in Alternative E, the development plans would be enhanced by the demolition of the existing plant. If the plant was to expand as proposed in Alternative B, development might be precluded. The plant expansion is planned for the same land area as part of the residential/commercial development.

Industry, Power Generation and Navigation and Transport. The different alternatives would not affect these beneficial uses.

Mitigation Measures

To mitigate impacts on domestic water use, the quantity of domestic water pumped from the river could be reduced. To compensate for this reduction, new wells could be installed and old ones improved.

To mitigate impacts on recreational uses, access to the river for swimming and boating could be limited near the outfalls. This could be achieved by preferentially improving areas downstream toward Post Falls rather than the areas near the discharge sites.

The river should be carefully monitored at a number of locations below the planned discharges. This would help to assure that water quality is maintained at an acceptable level for all beneficial uses. Emergency storage ponds should be installed at all treatment plant locations. This would increase protection from discharge of poorly treated or untreated wastewater. In addition, an efficient outfall diffusion technique should be used to substantially increase the dilution rate at the point of discharge.

Influence of Water Quality Changes on Spokane River Fishery

Existing Fishery

Fish species present in the Spokane River between Coeur d'Alene and Post Falls include cutthroat trout, rainbow trout, kokanee salmon, largemouth bass, pumpkinseed sunfish, yellow perch, black crappie, tench, northern squawfish, mountain whitefish, brown bullhead, and various sucker species (Goodnight, pers. comm.). Fish of significant interest to local anglers include the trout and salmon species which are primarily confined to Lake Coeur d'Alene and the upper reaches of the river.

Preliminary results from an ongoing study (Falter and Mitchell, 1980) indicate that kokanee salmon are not found in areas more than 2 miles downstream from the lake outlet and cutthroat trout are restricted to areas upstream from the U. S. 95 bridge. These two species were observed in the river during the May sampling periods coincident with sucker spawning but not during the August sampling periods. Concerted movement during the spring months into the river may be for initiation of spawning activity. However, most local experts (Goodnight, Falter, and Mitchell, pers. comm.) have indicated that this movement may only be for feeding in response to sucker spawning, as fish captured during this period possessed guts distended with eggs.

A warmwater fishery (bass, sunfish, black crappie) exists between Coeur d'Alene and Post Falls; presumably, spawning activity occurs in this area. The consequences of spawning downstream of the outfall sites will be discussed subsequently. Pumpkinseed sunfish, yellow perch, brown bullhead, and suckers were found throughout this area whereas northern squawfish and black crappie were found exclusively at the downstream sampling stations (Falter and Mitchell, pers. comm.).

Impacts of the Proposed Waste Treatment Facility on the Existing Fishery

No Action Alternative. Under this alternative, existing water quality conditions will continue subject to a gradual reduction in the level of effluent treatment due to overloading and aging of the facility discussed previously.

Heavy Metals. The toxic effects of these compounds on fish depend on a variety of factors, including temperature, DO concentration, water hardness, and the species itself. Generally, an elevation in temperature and reduction in DO increases the toxicity, especially to the more susceptible trout and salmon species (U.S. EPA, 1976). The conclusion of these observations is that discharge of heavy metals during the low flow summer months creates the highest probability of adversely affecting fish productivity.

Toxicity of heavy metals to fish is also influenced by water hardness. The harder the water the higher the concentration of compounds capable of complexing heavy metals, thereby reducing their harmful effects on fish. Consideration of this factor is important in assessing impacts in the Spokane River as water is classified as soft (0-50 mg/l $CaCO_3$) (U. S. EPA, 1976).

Mean lead concentrations (.006 mg/l) do not exceed EPA (1976) criteria for protection of freshwater organisms (.01-.025 mg/l). This figure, however, is occasionally exceeded during periods of high flows coincident with runoff in the Coeur d'Alene River basin. Suggested criteria for cadmium (American Fisheries Society, 1979) range from .0004-.001 mg/l for protection of salmonid species; these concentrations currently are exceeded under both mean flow and Q_{7-10} conditions (Tables 2-3 and 2-4). Past water quality studies (Funk, 1976) have indicated that these same cadmium concentrations were not harmful to fish. This discrepancy in conclusions is due to the wide divergence of opinion in the literature as to the actual values of toxic concentrations (U. S. EPA, 1976). Mean copper concentrations (.01 mg/l) are at the extreme lower range of concentrations necessary for protection of salmonid fish species (American Fisheries Society, 1979).

The metal of principal concern is zinc; mean concentrations (.245 mg/l) greatly exceed criteria established by the majority of researchers for the protection of freshwater organisms (American Fisheries Society, 1979; U. S. EPA, 1976), IDHW, 1976). Funk (1976) concludes that fish in the Spokane River have either adapted to high zinc concentrations or the zinc compounds measured are in a nontoxic form.

Concentrations of mercury never exceed .001 mg/l (Table 2-1), a level generally regarded as not significantly harmful to fish (American Fisheries Society, 1979). The EPA proposed criterion (Federal Register, 1980) for protection of freshwater organisms, however, is .0005 mg/l, a level at which accurate measurement is currently infeasible, especially considering the several aqueous chemical forms in which mercury exists.

Toxic Compounds. EPA proposed water quality criteria (Federal Register, March 15 and July 25, 1980) are exceeded by beryllium, arsenic, and silver concentrations in the Spokane River. Discharge from industrial and municipal concerns is primarily responsible for existing river concentrations. The American Fisheries Society (1979) has established much less stringent criteria for these elements and the compounds they form. Consequently established concentrations for the protection of freshwater species are not exceeded during any period throughout the year.

Background chlorine concentrations are not presented (Table 2-1) as no known studies have monitored this parameter (Gudenberger, pers. comm.). The existing Coeur d'Alene treatment plant discharges about 9 pounds per day which, under Q_{7-10} flow conditions during the N-A period (worst case basis), results in a .001 mg/l river concentration. This is well below current water quality criteria (U.S. EPA, 1976).

Mean unionized ammonia concentrations do not currently exceed EPA (1976) criteria (.02 mg/l) for protection of salmonid fish species. The unionized form of ammonia (NH_3) is generally recognized as the molecule toxic to fish. It exists in equilibrium with ionized ammonia (NH_4). Because of this relationship the concentration of unionized ammonia is affected by pH, temperature and hardness, as well as total ammonia concentration.

Preliminary findings (Falter and Mitchell, pers. comm.) show that the fish density and species composition immediately below the existing Coeur d'Alene treatment plant outfall site are not appreciably different than above the outfall site. This observation is one indication that the current concentrations of heavy metals and toxins discharged into the river are not significantly affecting fish productivity.

Dissolved Oxygen Decreases. Mean DO concentrations are currently in excess of minimum concentrations necessary to maintain good fish populations (Table 2-1). These measurements, however, were generally taken near the water's surface and in areas of moving water. Thus, oxygen depressions downstream in slow moving and standing waters discussed previously were not considered.

Fish embryonic and larval stages are especailly vulnerable to reduced DO concentrations because their ability to extract oxygen from the water is not fully developed and they cannot move away from adverse conditions (U.S. EPA, 1976). This is especially true of the salmonids which bury their fertilized eggs in gravel. The flow through gravel is often slow, especially if siltation has occurred. If it is slow enough, the developing fish and other benthic organisms can easily deplete the oxygen supply enough to cause damage, especially if the concentration in the water is relatively low before it enters the gravel (Cooper, 1965). The ongoing Spokane River study (Falter and Mitchell) should establish the extent of game fish spawning in the river, thereby determining any adverse effects on fish productivity due to decreased DO concentrations.

Warmwater species generally spawn in late spring and summer when temperatures are increased along with the concomitant DO decrease. Yearsly (1980) reports that vertical depression of DO was as much as 7.4 mg/l and average longitudinal depression as much as 2.0 mg/l during this period. Although many species can develop at DO concentrations as low as 2.5-3.0 mg/l, the effects of a reduced concentration even as high as 5 or 6 mg/l can cause a partial mortality or at least retard development (Brungs, 1971).

As discussed previously, treatment plant malfunctions are inevitable under the no-action alternative. Concentrations of unionized ammonia and chlorine, currently well below criteria standards, could increase to lethal contact concentrations resulting in substantial fish kills if untreated waste is discharged. The general reduction in overall water quality makes this alternative the most likely to adversely affect fish productivity.

Alternative B.

Heavy Metals. Concentration increases for all heavy metals under mean flow conditions will be in trace amounts (< .0005 mg/l). The coldwater fish species are generally more susceptible to additional heavy metal inputs; however, as resultant concentrations represent such a slight increase over existing concentrations, adult fish productivity should not be significantly affected. A properly diffused discharge should mitigate any localized effects below the outfall.

Deleterious effects of metals on fish are generally more severe in the embryo and fry stages (U. S. EPA, 1976). The 96-hour median tolerance limit (TLM) for fry of cutthroat trout has been reported to be as low as .09 mg/l zinc (Rabe and Sapington, 1970) and 0.1 mg/l for chinook salmon (Chapman). Both values are greatly exceeded by river concentrations. Both copper and lead concentrations also exceed reported 96 TLM values for coldwater game fish (McKim and Benoit, 1971). Values for brook trout fingerlings in soft water are about 0.1 mg/l copper with chinook salmon as low as .02 mg/l copper. Five-week posthatch coho salmon 96 TLM values for lead are 0.8 mg/l.

Increased mercury concentrations, although at barely detectable levels, exceed 96 TLM criteria for many game species. Matida, et al. (1971) found that median toxicity limits for phenyl mercuric acetate, methyl mercuric chloride and mercuric chloride with rainbow trout fingerlings were .009, .03, and 0.3 mg/l, respectively. Wobeser (1973) examined the toxicity of methylmercuric chloride to two life stages of rainbow trout. The 96-hour TLM for newly hatched sac fry was .024 mg/l of mercury, while rainbow trout fingerlings had a 96 TLM value of .042 mg/l.

Alternative B resultant concentration increases for all heavy metals are minute. Existing river concentrations, however, exceed 96 TLM values for the early life history stages of many fish species. The magnitude of the concentration increase alone would suggest that no significant reduction in present fish productivity would occur. Because toxicity values are influenced by a multitude of environmental factors, however, any conclusions on productivity that are based on these values are tentative.

Chlorine. The resultant increases under mean flow conditions (Table 2-3) are below EPA (1976) criteria of .003-.005 mg/l, assuming of course that the existing treatment plant at Coeur d'Alene is the only source of chlorine in the river. Criteria are exceeded under Q_{7-10} flow conditions. Localized effects of chlorine discharges, if not properly diffused, could produce adverse impacts even at these low concentrations. The high river volume to effluent discharge ratio, in conjunction with the proposed standard of effluent diffusion, should significantly reduce the impacts of additional chlorine.

Unionized Ammonia. Actual concentration increases are very small although total ammonia percentage increases under mean flow conditions exceed 300 percent. This reflects the low background concentrations. The assimilative capacity of the river again should significantly reduce any adverse effects on fish productivity.

Dissolved Oxygen. BOD_5 and total ammonia increases should have no significant effects on DO concentrations in the flowing sections of the river. As discussed previously, however, DO concentrations in downstream sections of slow flow or standing water may decrease below already low existing concentrations. Adult fish, repelled by low oxygen concentrations, particularly at high temperatures (Jones, 1952), can simply avoid those areas. Embryonic and larval stages, in contrast, cannot usually move away. Coldwater and many of the warmwater species generally spawn in shallow waters (kokanee salmon 0.1-1.8 inches, cutthroat trout 0.2-1.4 inches) (Bovee, 1978). This behavior would avoid exposure of young fish to the deep pool areas where DO concentrations are below recommended criteria. The minimal likelihood of game fish occurrence in downstream areas subject to DO depressions, combined with the natural proclivity of fish to avoid these areas, suggests that decreased DO concentrations due to additional BOD and total ammonia will not significantly reduce fish productivity.

Alternative E. Alternative E would have the same effects on water quality as Alternative B discussed previously. The outfall site being 1-2 miles downstream will only change the location of any localized effects in the river. Species migrating from Lake Coeur d'Alene to feed or spawn will encounter a larger expanse of river free of any adverse effects of treatment plant discharge. Thus, exposure to increased concentrations of heavy metals and toxic substances will be eliminated in this area. The reduced retention time between the Alternative E site and Post Falls, however, indicates that organic material and ammonia will undergo oxidation further downstream, possibly in areas of reduced DO concentrations. This would further restrict available spawning habitat for some freshwater fish species.

Alternative G. Localized and general water quality impacts on fish productivity would be similar to those of Alternative E during the N-A period. The absence of additional summer discharge above existing levels (Table 2-2) would eliminate any adverse impacts of Alternatives B and E during the months when impacts are most probable (M-O).

Early life history stages of the warmwater fish species would not be exposed to concentrations of heavy metals and toxins above current levels. The trout and salmon generally do not spawn during the M-O period, hence Alternative G would not be as advantageous to those species. From a fisheries perspective, Alternative G has the least potential for adverse impacts of all the alternatives considered.

Mitigation Measures

The following list includes potential water quality and fishery impact mitigation measures.

Continuation of Ongoing Studies

- Water quality studies by the USGS should continue to supplement the small amount of data available on the Spokane River between Coeur d'Alene and Post Falls.

- The State of Washington waste allocation study should establish specific loading limits for the Spokane River upstream of the Idaho/Washington state line.

- IDHW effluent monitoring studies at Coeur d'Alene should continue to quantify any increases in concentrations of toxic substances.

- The fisheries study (Falter and Mitchell) should identify species density and composition and the extent of fish movement and spawning in the Spokane River.

Initiation of Future Studies

- Water quality immediately below the outfall of all municipal and industrial point source discharges on the Spokane River should be periodically sampled.

- The source of those heavy metals and toxins exceeding EPA proposed water quality guidelines should be identified.

- Re-aeration and dilution rates in the river below Coeur d'Alene should be calculated to enable better assessment of future discharges on water quality.

- A determination should be made as to whether river activities, such as log storage or riverside urban development, are hindering spawning activity or destroying potential spawning sites.

- Fish bioassays should be periodically conducted to determine if metal and/or toxin levels are excessive.

General Measures

- Effluent discharged into the river should be adequately diffused to alleviate any localized effects.

- If determined that metal or toxin concentrations are reducing fish productivity below acceptable levels, effluent should be disposed of on land sites or additional treatment should be required.

- o If determined that phosphorus or nitrogen loading is in excess of maximum permissible levels, effluent should be disposed of on land sites or additional treatment should be required.
- o Once the source of heavy metals and toxins is discovered, plans should be implemented to achieve EPA proposed water quality guidelines.

Impact on the Rathdrum Prairie Aquifer Water Supply

The effect of the proposed Coeur d'Alene facilities plan on the Rathdrum Prairie aquifer (Figure 2-2) is one of the major environmental issues of this project. This is due primarily to the aquifer's status as a designated "sole source" of water supply. EPA made this designation under authority of the federal Safe Drinking Water Act in February 1978. As of 1976 the aquifer was being used as a water source by about 338,000 people in northern Idaho and eastern Washington (Drost and Seitz, 1978).

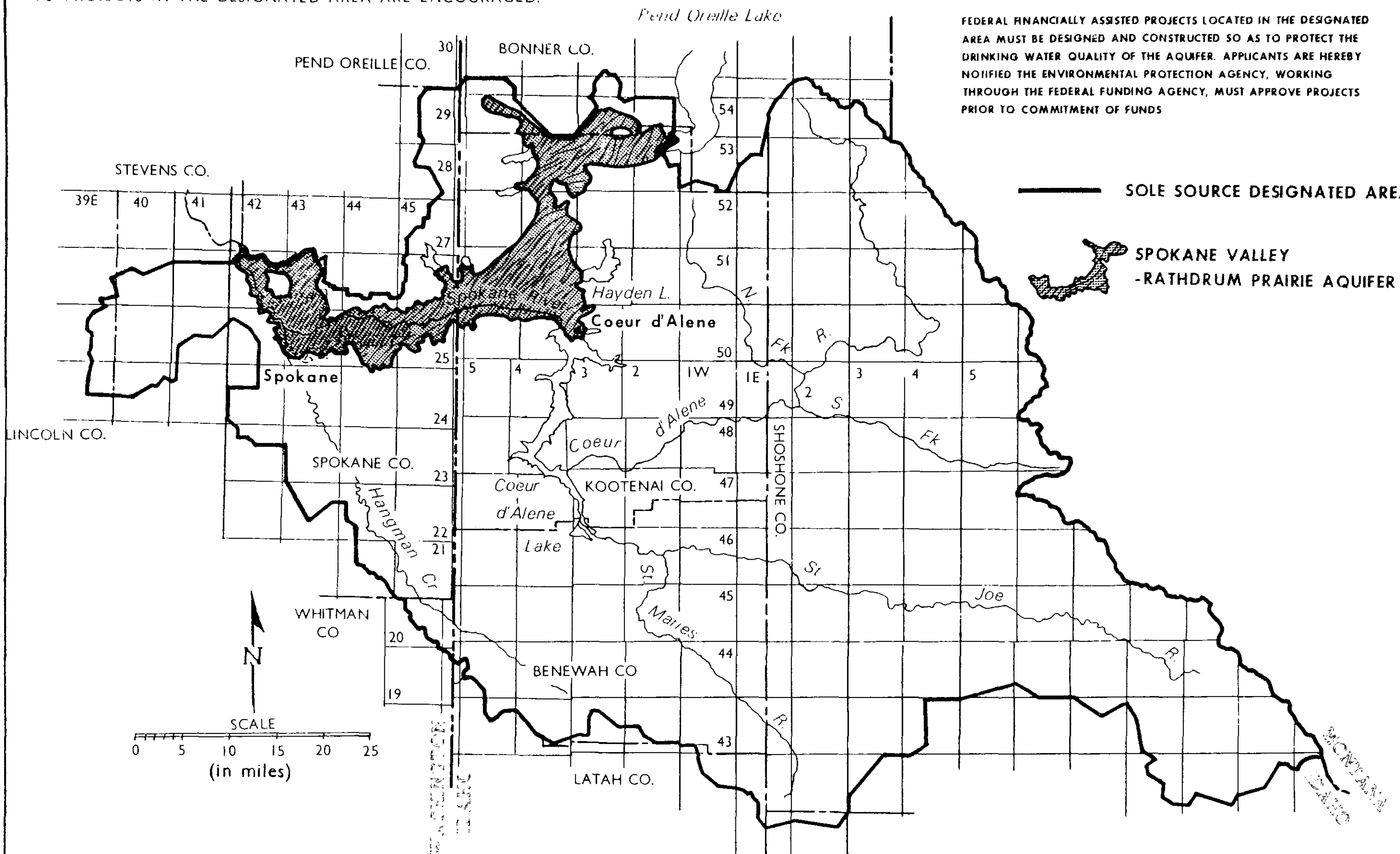
Character of the Aquifer

The Spokane Valley-Rathdrum Prairie aquifer was studied in detail over the past 4 years. The most comprehensive physical description was prepared by Drost and Seitz (1978) for the USGS. This report should be referred to for a complete description of the aquifer's character. In general, the aquifer is composed of unconsolidated glaciofluvial deposits covering an area of about 350 square miles, stretching from Pend Oreille Lake, Idaho on the north to the confluence of the Spokane and Little Spokane Rivers west of Spokane, Washington. Both the surface soils and the underlying deposits are extremely porous and are capable of rapidly transmitting water. The underground water body flows southerly then westerly at a rate of up to 64 feet per day and lies from 40-400 feet below the surface. The total recharge and discharge of the aquifer is estimated to be 1,320 cfs (Drost and Seitz, 1978). The present water quality of the aquifer is described as good, with a very small percentage of water samples showing contaminants in excess of the maximum contaminant levels (MCLs) included in the National Interim Primary Drinking Water Regulations (NIPDWR; 40 CFR 141).

The City of Coeur d'Alene is located over the southeast corner of the aquifer. The groundwater in this area flows out north of Lake Coeur d'Alene and then turns west toward Post Falls where it eventually merges with the main arm of the aquifer. This Coeur d'Alene arm has a relatively low hardness, ranging from 88.7-114.5 mg/l. Nitrate levels in the Coeur d'Alene arm recorded in 1976 ranged from 1.2

1) COMMENTS (WITH SUPPORTING DOCUMENTATION) APPLICABLE TO PROJECTS IN THE DESIGNATED AREA ARE ENCOURAGED.

FEDERAL FINANCIALLY ASSISTED PROJECTS LOCATED IN THE DESIGNATED AREA MUST BE DESIGNED AND CONSTRUCTED SO AS TO PROTECT THE DRINKING WATER QUALITY OF THE AQUIFER. APPLICANTS ARE HEREBY NOTIFIED THE ENVIRONMENTAL PROTECTION AGENCY, WORKING THROUGH THE FEDERAL FUNDING AGENCY, MUST APPROVE PROJECTS PRIOR TO COMMITMENT OF FUNDS



NOTE
DESIGNATED UNDER THE AUTHORITY OF SECTION 1424(e) OF THE SAFE DRINKING WATER ACT (PL 93-523) (FEDERAL REGISTER, VOL 43, NO. 28-THURSDAY FEBRUARY 9, 1978)

FIGURE 2-2
SOLE SOURCE AREA FOR THE SPOKANE VALLEY—RATHDRUM PRAIRIE AQUIFER

EPA

mg/l (as NO_3) on the western edge of Coeur d'Alene to 8.0 mg/l (as NO_3) near Post Falls (the original federal drinking water standard for nitrate was 45 mg/l, measured as NO_3; the current NIPDWR nitrate standard is 10 mg/l measured as N). The increasing nitrate levels are ascribed to septic tank use in this urbanizing area (PHD, 1977). The aquifer is from 150-200 feet below the ground surface in the Coeur d'Alene area.

The area selected for possible irrigation disposal of wastewater (Alternative G) is located from 1-5 miles north of Coeur d'Alene (Figure 1-5) straddling the mixing zone between the Coeur d'Alene and main arms of the aquifer. Groundwater in this area flows generally west and southwest. Water from the main arm mixes with outflow from both Lake Coeur d'Alene and Hayden Lake in the southern portion of this irrigation area. The northern two-thirds of the area is underlain by the main arm of the aquifer, which has a hardness ranging from 123.7-154.7 mg/l. The area to the south that is strongly influenced by Hayden Lake outflow has a much lower hardness, as low as 77.1 mg/l (PHD, 1977). Nitrate levels have not been monitored below the irrigation area, but levels recorded in the main arm of the aquifer are generally lower than those in the Coeur d'Alene arm. Mean nitrate levels in the Dalton Gardens area, however, were 8.3 mg/l (as NO_3) in 1976 (PHD, 1977). This is just east of the southern portion of the irrigation area. Groundwater is from 250-320 feet below the ground surface in this area (Idaho Department of Water Resources, pers. comm.).

Present Health Threat

According to preliminary 1980 census data, the City of Coeur d'Alene has a population of 20,019. Brown and Caldwell (1980) estimates that 5,800 of these residents use septic tank and leachfield systems for wastewater disposal. An additional 4,200 people living within the planning area but outside the city also rely on septic tanks for wastewater treatment. These systems are located over the Rathdrum Prairie aquifer. The highly permeable nature of the soils and subsurface alluvial deposits over the aquifer have prompted recent studies to investigate whether or not the domestic wastes are degrading the water quality of the aquifer. The most comprehensive investigation, the Rathdrum Prairie Aquifer Water Quality Management Plan, concluded that nitrates from the on-site disposal systems were migrating through the soil into the aquifer. This was evidenced by elevated and apparently increasing nitrate (NO_3) levels in wells in and downgradient from areas that have a high density of housing (PAC, 1978). Nitrates are used here only as an indicator of the public health risk. Other substances known to occur in domestic wastewater (e.g., biological agents, metals, pesticides, complex organic and inorganic chemicals) are also of concern to people drawing water from the Rathdrum Prairie aquifer.

The PHD analyzed a large number of well water samples as part of the Rathdrum Aquifer Water Quality Management Plan (frequently referred to as the 208 plan because the effort was initiated and funded under Section 208 of the Federal Water Pollution Control Act). The sampling results were reported both in PAC (1978) and PHD (1977). Nitrate levels in the groundwater on the northern and western fringes of Coeur d'Alene ranged from 1.7-3.7 mg/l (as NO_3). The NO_3 levels showed a gradual increase in a westerly direction with levels as high as 8.0 mg/l (as NO_3) near Ross Point.

These NO_3 levels are well within the mandatory drinking water standard of 45 mg/l NO_3 listed in the NIPDWR. The concern is due to the trend of rapid population growth over the aquifer (therefore rapid increases in use of on-site waste disposal systems) and the apparently rapid increase in NO_3 levels over the past few years. Wells in Post Falls that reported .80 mg/l nitrate (as NO_3) or less prior to 1965 are now reporting levels as high as 8.0 mg/l (as NO_3) (PAC, 1978; Table 7). More recent water quality monitoring conducted by EPA has found synthetic organic chemicals in small concentrations at several locations in the aquifer. As an example, a Post Falls well on Spokane Street was found to contain 16 parts per billion (ppb) 1,1,1, Trichloroethane (U. S. EPA, pers. comm.). This substance is listed as a hazardous waste in the Resource Conservation and Recovery Act (RCRA) of 1976. Similar compounds are considered carcinogenic in concentrations as low as 100 ppb. A sample from the City of Coeur d'Alene Atlas well contained 0.1 ppb chloroform. While the recently measured contaminant levels do not represent an imminent health hazard, the presence of these man-made chemicals indicates that man's activities over the aquifer are influencing the quality of drinking water supplies.

The City of Coeur d'Alene is concerned about this existing health threat because it draws the majority of its drinking water from the aquifer below the city. Three of its wells are located in the north-central part of the city and two are located in the northwest extremity. The two northwest wells (Atlas and Country Club) are downgradient from the large number of septic tanks in northern Coeur d'Alene and Dalton Gardens.

Both Idaho and Washington 208 studies over the aquifer have identified septic tanks and cesspools as a primary cause of elevated nitrate levels in the groundwater (PAC, 1978; Esvelt, 1978). Both reports also list specific instances where industrial waste disposal has contributed hazardous materials to the groundwater. EPA has adopted these 208 plans and supports local efforts to continue with water quality management work. EPA also supports local efforts to reduce the existing water quality threats. Additional work is being conducted by the USGS to assist in understanding the relationship between septic tank effluent, nonpoint pollutant sources and aquifer water quality.

Resultant Regulatory Controls

A variety of local, state and federal regulations have been spawned by concern for the aquifer. On a local level, the PHD has implemented a number of aquifer protection regulations as a result of the 208 study. The Idaho Code, Title 39, Chapter 4 gave the PHD authority to adopt and enforce rules and regulations for sewage disposal on the Rathdrum Prairie in Kootenai County, Idaho. These regulations in effect discourage construction of on-site wastewater disposal systems over the aquifer on parcels of less than 5 acres, unless the land is located within the proposed sewer service area of a city or district with a sewer management plan approved by PHD Board of Health. There are exceptions to this 5-acre limitation, but the net effect of the PHD regulations has been to channel most growth over the aquifer into areas that are likely to be served by a central sewage collection and treatment system. The City of Coeur d'Alene entered into an agreement with the PHD on May 1, 1979 which obligated the city to proceed on planning for an expanded central sewage collection, treatment and disposal facility. The boundaries of sewer service responsibility were defined and are nearly the same as the existing city limits. Developments within the city are subject to review by PHD to ensure that on-site disposal facilities are properly designed and that new subdivisions are either tied directly into the city collection system, or have included dry sewers that may be readily integrated into a central collection system.

The water quality management plan for the Rathdrum Prairie aquifer included 30 policies aimed at protecting the aquifer from various sources of pollution. The policy that deals specifically with land application for disposal of wastewater requires that such application be designed "to prevent the movement of nutrients or other pollutants off the site and into surface waters, or beyond the subsurface pollutant removal zone and into the aquifer" (PAC, 1978).

Several state regulations are designed to protect the Rathdrum Prairie aquifer and therefore will affect Coeur d'Alene's project. Idaho has designated the aquifer as a domestic water source and therefore must ensure that proposed projects will not cause violations of the NIPDWR. The aquifer is also classified as an Outstanding Resource Water. Under recent revisions to the state water quality standards, this means that the state's anti-degradation policy applies. This policy specifies that special resource waters cannot be lowered in quality unless and until it is proven to the IDHW and EPA that the change is justifiable for economic and social reasons and that assigned and possible uses of the water will not be injured.

The Idaho water quality standards also place some limits on land treatment and disposal of wastewater. Section XI, Part A of the standards require that sprayed effluent be retained on the designated disposal site or a waste discharge permit must be obtained. It also requires that: 1) groundwater be monitored in the area, 2) no groundwater mound or salt buildup be created on another person's property, and 3) no public health hazard, nuisance condition or air pollution problem be created.

Section 1424(e) of the Safe Drinking Water Act allows the EPA Administrator to designate an aquifer as a sole source of drinking water for an area. The Spokane Valley-Rathdrum Prairie aquifer was designated as such in February 1978. This designation requires that all federal agencies ensure that they do not provide federal financial assistance to any project or action that may contaminate a sole source aquifer and result in a significant hazard to public health. A "significant hazard to public health" is defined as any level of contaminant which causes or may cause the aquifer to exceed any MCL set forth in any promulgated NIPDWR standard at any point where the water may be used for drinking purposes; or which may otherwise adversely affect the health of persons; or which may require a public water system to install additional treatment to prevent such adverse effect. The NIPDWR standards (40 CFR 141) place maximum acceptable levels on a wide variety of water contaminants, including a number that are typically found in domestic wastewater (see Appendix B for NIPDWR standards).

In the absence of federal regulations and formal guidance regarding land treatment of wastewater in sole source aquifer areas, EPA Region 10 developed preliminary guidance for the City of Coeur d'Alene. This guidance indicates that land application projects over the aquifer will require thorough monitoring of both effluent and percolate from the irrigation area (U. S. EPA, pers. comm.). The details of this guidance are discussed in the mitigation portion of this section.

Impact of Wastewater Facilities Alternatives

"No Action". If the city takes no action to improve and expand wastewater service, most residents in the area now using septic tanks will continue using them. New construction allowed by the city and county will probably also rely on septic tank disposal of wastewater, at least as an interim solution. These individual systems will continue to contribute wastewater contaminants to the Rathdrum Prairie aquifer.

The actual size of this waste contribution has not been measured, but evidence gained from groundwater quality monitoring (PAC, 1978) does indicate that septic tanks are contributing to groundwater degradation in the Coeur d'Alene-Post Falls area. Brown and Caldwell (1980) has estimated that 5,800 residents of Coeur d'Alene and 4,200 residents of the county within the facilities planning area are presently using some type of on-site waste disposal system. These numbers would be expected to gradually increase under the "no action" alternative.

Walker, et al. (1973) estimated that the average family of four contributed 73 pounds of NO_3-N (nitrate measured as nitrogen) to the groundwater each year through septic tanks in sandy Wisconsin soils. This number may not be directly applicable to the Coeur d'Alene area because groundwater depths differ between the areas and the similarity of soil conditions is not known, other than that coarse glacial soils are found at both locations. The Walker study does indicate, nonetheless, that the NO_3 contamination of aquifers in areas of coarse soils can be sizable. The cause for concern is heightened when the urban densities in the Coeur d'Alene area are considered.

The PHD regulations that restrict development densities to 1 unit per 5 acres outside the Coeur d'Alene Sewer Management Plan (SMP) boundaries and the SMP itself should restrict septic tank proliferation under the "no action" option. The groundwater contamination problems, therefore, would not rapidly increase. It is possible, however, that without new central wastewater facilities in the Coeur d'Alene area, development pressures could result in a modification of the PHD density restrictions; or, development might be pushed to other parts of Kootenai County when wastewater facilities are more readily available. If septic tank use restrictions were eased, serious contamination of the aquifer would be likely to occur.

Elimination of Septic Tanks. Each of the three action alternatives (B, E, and G) would provide the treatment capacity and interceptor system to hook up planning area residences now using septic tanks. Construction of one of these alternatives would also ensure that new residences in the area would not have to rely on septic tanks. Brown and Caldwell (1980) estimated that there are now 10,000 unsewered residents in the planning area and that 5,000 of these would eventually hook up to an expanded city wastewater system. This would be a significant public health benefit, as septic tank contamination of the aquifer would be reduced.

Using Walker's, et al. (1973) estimate that 73 pounds NO_3-N per year can be contributed to groundwater by a family of four using a septic tank, the total NO_3-N loading on the aquifer could be reduced by more than 91,000 pounds annually by hooking up these 5,000 unsewered residents. This number is strictly hypothetical, but gives some indication of the possible size of the load reduction.

The change this is likely to create in aquifer water quality has not been calculated. It would depend in part on what land use and sewering changes occur in the Dalton Gardens and Hayden areas. The impact, however, undoubtedly would be positive. Waste constituents, including nitrates, pathogenic organisms and other potentially harmful agents that are presently being carried underground with only minimal treatment, would instead receive biological secondary treatment and be discharged to the Spokane River (or to the land under Alternative G). The removal of wastewater pollutants would obviously be enhanced by this change in treatment and disposal for 5,000 residents living over the aquifer.

Sludge Disposal. Each of the alternatives would generate waste sludges that must be processed and discarded or recycled Currently, the city plant generates about 90,000 pounds of sludge per month (on a dry weight basis). This material is trucked to an area near the city landfill 1 mile north of town and dewatered in shallow drying beds. It is later scraped from the beds, mixed with soil and leaf mulch, and stockpiled on-site. In the past, this material has been hauled to Canada and used in a soil-building operation. Some is also used as a soil amendment by local residents (Brown and Caldwell, 1980). The water in the sludge either evaporates or percolates through the soil into the subsurface. There is no drainage system to catch percolate from the site.

Under the "no action" alternative, this sludge disposal method would continue. Sludge volumes would remain about the same. Leachate from the existing drying area has not been monitored, but it is undoubtedly carrying some wastewater constituents into the aquifer. The 208 study monitored a well on the city landfill site and recorded a groundwater NO_3 mean concentration of .1 mg/l from six samples in 1976. The static water level in the well was about 160 and samples were being drawn from about 170 (PHD, 1977). No serious contamination of the monitoring well had occurred at that time. Site-specific groundwater flow characteristics and percolate dispersal mechanics are not known well enough, however, to conclude that the sludge drying operation is not seriously affecting the aquifer. As mentioned earlier, groundwater NO_3 levels do increase gradually downgradient (to the west) of Coeur d'Alene. Brown and Caldwell (1980) states that the IDHW finds these present sludge disposal practices acceptable. The PHD, however, has encouraged the city to relocate its sludge disposal operation to the PHD-approved septage disposal site east of Round Mountain (Lustig, pers. comm.). This is about 13 miles north of Coeur d'Alene.

The three action alternatives would result in a major increase in sludge volumes. The combination of increased wastewater flows and chemical removal of phosphorus would stimulate these increases. Brown and Caldwell (1980) estimates that the volume of sludge generated could increase by as much as 300 percent by 1995 under Alternatives B and E. The exact amount would depend upon the number of new sewer hookups and the phosphorus removal requirements of the NPDES permit. Alternative G would generate a much smaller increase because aerated lagoons effectively produce no sludge. Solids accumulate on the bottom of the lagoons and are removed only once every 5 or 6 years.

A 300 percent increase in sludge on a dry weight basis would mean that 1,620 tons would be produced annually. Both Alternatives B and E propose mechanical dewatering of sludge rather than the present method of dewatering near the landfill. If the sludge is dewatered to 20 percent solids, approximately 8,100 tons of sludge would be produced annually. Under Alternative B, this material would be trucked to the existing disposal site at the city landfill. This increase in volume could create a capacity problem at the landfill, especially during winter months. The volume of percolate moving down into the aquifer would also increase significantly.

The concern over the percolate is due not only to the nitrates that might enter the aquifer but also heavy metals and other contaminants that are likely to be present. Heavy metals contained in wastewater tend to accumulate in sludge. There is very little information on the metals content of Coeur d'Alene sludge, but sludge supernatant samples analyzed by the IDHW in August 1975 contained 0.04 mg/l cadmium and 0.86 mg/l lead. The NIPDWR maximum contaminant levels for these two inorganic chemicals in a community water system are 0.010 and 0.05 mg/l, respectively.

These limited data are not sufficient to warrant immediate concern for the proposed sludge disposal practice, but it does indicate that closer scrutiny of the proposal is justified. The city's Atlas and Country Club water supply wells both draw water from the aquifer less than 2 miles east of the sludge drying facilities. Section 1424(e) of the Safe Drinking Water Act prohibits federal grant assistance of projects which the EPA Administrator determines might create a significant health hazard within a sole source aquifer. In addition, proposed rules for implementation of the federal RCRA prohibit disposal of a hazardous waste in the recharge zone of a sole source aquifer unless it can be demonstrated that the disposal does not endanger the aquifer (40 CFR 250.43-1[g]). Municipal wastewater sludge can be designated a hazardous waste under RCRA if it is found to contain high levels of any of the over 400 hazardous materials presently listed in RCRA.

Sludge disposal under Alternative E could occur just as proposed for B; the impacts would therefore be similar. Brown and Caldwell has also investigated an alternative method. There is the possibility that Idaho Forest Industries, which operates a lumber mill near the Alternative E treatment plant sites, may construct a waste wood-fired electrical generating facility in that area. Definite plans have not been made, but Brown and Caldwell has made initial inquiries into the feasibility of incinerating partially dewatered sewage sludge in that new 1F1 facility. The proximity of the 1F1 operation and the Alternative E plant sites would make this a possibility. If this disposal mode was used, there would be no potential groundwater impact from sludge disposal.

Under Alternative G, there would be only about half as much sludge generated as Alternatives B and E. This is due to the fact that about 2.0 MGD of the 4.2 MGD wastewater generated in the Coeur d'Alene system by 1995 would be treated in lagoons north of town. This treatment mode collects waste solids on the bottom of the lagoons, and requires disposal only once every 5 or 6 years. Groundwater quality concerns would be similar to those described for Alternative B, but on a smaller scale.

Land Disposal of Wastewater. Alternative G proposes land disposal of a portion of Coeur d'Alene's wastewater between April 15 and October 15 of each year. Of the 6.0 MGD of wastewater expected to be generated by 2005, 3.8 MGD would be applied to the land. This wastewater would receive secondary treatment in aerated lagoons, be disinfected, and sprinkler irrigated on grass or alfalfa crops north of Coeur d'Alene (Figure 1-5). Up to 850 acres of land would eventually be irrigated. The dominant soils in this disposal area are Avonville fine gravelly silt loam and McGuire-Marble Association. These coarse soils have a moderate to rapid permeability and an extremely low available water capacity. This indicates that water applied to the soils will rapidly percolate through to underlying substrate.

Although Alternative G was selected for detailed consideration in the facilities plan, the plan provides only a limited amount of information on the irrigation disposal operation. Brown and Caldwell (1980) concluded that the alternative's high cost, the potential health threat to the Rathdrum Prairie aquifer, and EPA's detailed monitoring requirements make the alternative unacceptable.

The information that was developed includes an effluent application rate of 30 inches per acre over the 6-month irrigation season for an average of 5 inches per acre per month. The estimated nitrogen loading rate would be 200 pounds per acre per year (Brown and Caldwell, pers. comm.). Nonfood crops such as grass seed or alfalfa would be grown and harvested on the irrigated acreage. No data were developed to describe the monthly or annual loading rates of other wastewater constituents of interest, including heavy metals, or the various other inorganic and organic materials considered potentially hazardous under the NIPDWR or the Clean Water Act. Also, there was no attempt to assess the possibility that any of these materials might reach and contaminate the underlying aquifer.

Data collected by the IDHW were used to estimate the daily loading of several Coeur d'Alene wastewater constituents in the surface water quality section of this report (see Table 2-2). Table 2-9 modifies that data and compares the estimated 20-year soil loading rates that might occur under Alternative G with suggested maximum accumulated application loadings listed in the EPA land application process design manual. None of the parameters for which data are available would be exceeded under Alternative G.

No attempt has been made to calculate what percentage of the applied wastewater constituents, including nitrogen would eventually reach the groundwater below the irrigation areas. This would depend upon a variety of operational factors which have not been specified in the facilities plan, including whether or not the irrigation schedule would be uniform or tailored to evapotranspiration potential. Evapotranspiration potential fluctuates through the 6-month period. It also depends on the frequency and method of removing crops. A high percentage of the nitrogen could be removed through volatilization and crop uptake if the irrigation scheme was properly devised.

Although groundwater immediately below the irrigation area has not been closely monitored, samples analyzed from wells both east and south of the area have not contained pollutant concentrations that exceed NIPDWR maximum contamination levels. Nitrate levels in the Dalton Gardens well

Table 2-9. Estimated Soil Loading Rates for Potentially Toxic Elements

Parameter	Estimated Effluent Concentration mg/l[1]	20-Year Mass Application to Soil Pounds Per Acre	Suggested Maximum 20-Year Application[2] Pounds Per Acre
Cadmium	<.005	.68	8
Lead	<.050	6.8	4,080
Zinc	.293	39.8	1,640
Copper	.035	4.7	164
Arsenic	<.01	1.4	82

[1] IDHW, 1980.

[2] U. S. EPA, 1977.

registered as high as 8.3 mg/l (as NO_3) in 1976 according to the PHD (1977). Wells to the south, however, contained much lower NO_3 concentrations (1.7-3.7 mg/l). It is likely that NO_3 levels below the irrigation area would gradually increase as nitrogen from the wastewater percolated through the soil into the subsurface.

This irrigation contribution might never cause the NIPDWR NO_3 standard of 45 mg/l to be exceeded. It should be pointed out, however, that nationwide there is increasing concern for other potentially hazardous substances that are being found in domestic wastewater. Potentially toxic metals, pesticides, herbicides and other complex organic and inorganic chemicals are being found in wastewater effluents and drinking water supplies taken from underground sources. Many of these materials are not commonly tested for, and the health effects are not well understood. This is pointed out because even through land application can provide additional wastewater treatment while allowing a recycling of water, the filtering effect of soils and the action of organisms in the aerobic soil layer may not be as efficient at assimilating and breaking down some potentially hazardous substances as is discharge to surface waters. The action of sunlight and the numerous biological agents in a flowing stream provide a significant level of treatment that is not available in a subsurface aquifer.

These potential groundwater impacts are of concern because, as mentioned before, the aquifer in the area has been given a sole source designation by EPA. This requires careful consideration of any actions which might degrade aquifer quality. In addition, there are 15-20 domestic water supply wells in the immediate vicinity of the irrigation area (Idaho Department of Water Resources, pers. comm.). While most of these wells are drawing water from depths greater than 250 feet below the surface the chance for contamination exists.

The bulk of this irrigation disposal analysis has focused on its potential negative impacts. There are two positive aspects. First, the nitrogen and phosphorus present in wastewater effluent is valuable as a crop fertilizer. Use of the effluent would reduce applied fertilizer demands to some degree. Second, the wastewater irrigation represents a reuse of water. Pumped groundwater demands would be reduced in the area irrigated. However, there is currently no water shortage in the area and much of the groundwater pumping energy savings that might be realized would be lost to the pumping needed to move effluent north from Coeur d'Alene to the proposed irrigation area.

Risk Analysis - Land Disposal vs. River Disposal

The fact that both land application or river discharge of Coeur d'Alene's wastewater could ultimately degrade a major drinking water source (Spokane Valley-Rathdrum Prairie aquifer) to some degree, makes it especially important to consider the risks involved with each alternative. As noted earlier, it is difficult to quantify the impact of either alternative. There are insufficient data on actual effluent quality and local groundwater hydrology to place specific numbers in the impact discussion. Therefore, it is valuable to describe the various subjective elements of risk that can be associated with each disposal mode.

Comparative Benefits. The most obvious benefit of river disposal compared to land disposal is cost. The capital cost of Alternative B is $6.4 million lower than Alternative G. In local costs, Alternative B is about $1.4 million less costly to Coeur d'Alene in the initial construction phase than Alternative G. Finally, in terms of estimated user cost increases, Alternative B would be lower than Alternative G by $4.31 per month in 1983 (Brown and Caldwell, 1980). The river discharge options (Alternatives B and E) require less energy to operate annually and Alternative E might actually encourage some power generation through incineration of sludge.

In contrast, the land disposal proposal provides a recycling of nutrients and water. With the irrigation operation at its design capacity of 3.8 MGD, it would supply 634 pounds per day of nitrogen and 222 pounds per day of phosphorus. The 3.8 MGD of wastewater would replace the pumped groundwater needs for 850 acres of cropland. There is no shortage of water in the irrigation area, however, so the reuse would not release a supply needed for a higher use (e.g., domestic water supply).

An additional benefit of the land application option would be a reduction in the waste load to the Spokane River. As indicated in the surface water quality section, the impact of the summer discharge to the river is not totally definable, but some increases in algae production are expected. Some obvious public health, aesthetic and psychological benefits would also accrue to recreational users and persons that draw domestic water supplies from the river below the discharges of Alternatives B and E.

Knowledge of Contamination Mechanism. Technical knowledge of the real health risks created by contamination of water supplies with elements and compounds labeled as hazardous is relatively incomplete. Many water contaminants have been labeled as hazardous after relatively brief laboratory testing on animals. However, public health testing must be stringent and is designed to provide maximum protection to the public. Testing results have provided sufficient proof that a hazard to man exists if hazardous materials are ingested by drinking the water. In addition, knowledge is very limited regarding the quantity and numbers of hazardous wastes likely to be in the Coeur d'Alene effluent. In light of this imperfect technical knowledge, we must discern whether it is better to dispose of the effluent on the land or in the river. To help define this issue, the relative knowledge of pollutant transfer from disposal area to drinking water supply can be compared.

The transfer or convergence of wastewater constituents from a sewage outfall to the river is easily understood, and the levels of contamination can be easily estimated and measured downstream.

In comparison, the transfer of pollutants from a land application site to the groundwater is not as well understood and definitely less observable or measurable. Some information is available about the filtering ability of soils, but this pertains primarily to classic pollutants, such as nitrate, bacteria, viruses and heavy metals. Relatively little is known about the fate of the many complex organic compounds now being produced by man and considered hazardous. In addition, the actual hydraulic relationship between land-applied wastewater and the underlying aquifer is only speculative. The ability to monitor and detect the transfer of pollutants at a land disposl site is poor compared to river discharge.

<u>Probability and Cost of a Catastrophic Impact</u>. Probably the most severe or catastrophic event that could be associated with disposal of Coeur d'Alene's wastewater would be an uncontrolled discharge of untreated and/or highly toxic materials. This could be created by an undetected release of toxic materials into the city's waste stream. This worst-case scenario would not be a serious public health threat unless discharge contaminated a drinking water supply or water contact recreational waterway.

If such an event were to occur in a Spokane River discharge, the river itself would immediately be a health threat to those persons drawing drinking water from the river and those water contact recreationists using the river downstream. Some portion of the contaminant could also eventually move into the aquifer through the river's recharge zone and threaten major groundwater water supplies downgradient. The positive aspect of the river discharge option is that the chance of early detection of the hazardous discharge is much greater than with land disposal. Cleanup of the river would also proceed more rapidly due to the natural cleansing action of sunlight and the biological activity normally found in a stream. Until the contamination was cleaned up, the comparatively small number of persons using the river as drinking water would have to seek another water source. Contact recreationists would have to avoid the river.

If a hazardous discharge occurred at a land disposal site, there would probably be no immediately recognized public health threat. Depending on the nature of the contaminant and its propensity for uptake by plants or adsorption to soil particles, there is the possibility that it would not migrate to the groundwater supply. The negative side of land discharge is that once any hazardous material moved below the aerobic soil layer, it would be exposed to little or no biological modification and could not be cleaned up by human action. If an acute or chronic discharge of toxic materials did enter the groundwater and create a public health hazard, an extremely large segment of the area's population (in the Post Falls area and eastern Washington) might have to seek a new water source.

Latency. The actual health effects of groundwater contamination, if it were to occur, might not be felt for many years, and might never be positively traceable. This is due, in part, to the fact that some waste materials are hazardous only after chronic exposure over relatively long time periods. It might also take a considerable amount of time for hazardous materials to migrate from the disposal area to a portion of the groundwater that is being used domestically. The travel time would be much slower from the irrigation disposal operation, but the latency of effect could be true for either land disposal or river discharge. Tracing a hazardous discharge and assigning liability for it would be easier with a river discharge of wastewater than with land application.

Irreversibility. Water contamination created by a surface water waste discharge would be much easier to correct than one created by an irrigation disposal operation. A surface water contamination can be detected more readily. It is also usually subject to greater diffusion and dilution, and it is more accessible to natural or human cleanup. In the case of a discharge to the Spokane River at Coeur d'Alene, it might also have an impact on the groundwater downgradient. The City of Spokane's Well Electric, a major domestic water supplier, is located adjacent to the river 30 miles downstream. It draws groundwater downgradient from where the Spokane River recharges the aquifer. The major impact, however, would remain in the stream environment.

Summary of Risk Assessment. There are several elements of rish that should be summarized from the preceding discussion. First, the probability of the Coeur d'Alene waste discharge containing materials that pose a serious public health threat is very speculative. Local, state, and federal regulation of wastewater treatment facilities are aimed at avoiding any hazardous waste discharges. If, however, hazardous materials were carried in the effluent, the detection and cleanup would be easier with a year-round river discharge. In addition, prediction of the eventual effects of a discharge to surface waters is more likely to be valid than prediction of subsurface changes and movements of materials in the Rathdrum Prairie aquifer. Finally, even if the low probability of creating a serious public health threat supports selection of seasonal land disposal, Coeur d'Alene and its residents would be paying a higher cost for wastewater service if land disposal was implemented. The users of the Spokane Valley-Rathdrum Prairie aquifer below Coeur d'Alene would have the low probability risk of exposure to a public health hazard, should hazardous wastes enter the aquifer from either a river or land disposal.

Mitigation of Potential Groundwater Quality Impacts

Legal Authority for Mitigation. There are a number of federal laws and regulations which allow EPA to reduce the probability that a groundwater-related health hazard would be created by disposal of Coeur d'Alene wastewater. The Clean Water Act, which gives EPA permit authority over any wastewater discharge to surface waters of the United States, is the major tool. The EPA-issued NPDES permit will specify the level of wastewater contaminants (5 conventional plus any of over 65 priority pollutants) that can be contained in any effluent discharged to surface waters (33 USC 1251 Sec. 402[a]). In addition, the Clean Water Act allows EPA to require an inventory of significant industrial or commercial waste stream sources and a pretreatment ordinance for waste streams containing a toxic pollutant (33 USC 1251 Sec. 402[b] [8]).

The federal Safe Drinking Water Act, which gave EPA the authority to designate the Rathdrum Prairie aquifer as a "sole source" water supply, also prohibits EPA from funding a project which would create a significant health hazard in the aquifer (42 USC 300f, 300h Sec. 1424[e]). To meet this legal requirement, EPA can place conditions (i.e., monitoring requirements, operational requirements, etc.), on the grant to Coeur d'Alene for design and construction of its treatment plant and disposal system.

A third source of influence EPA can utilize as a basis for mitigation is the aquifer protection policy of the federally-adopted 208 water quality management plan for the

Rathdrum Prairie aquifer. It requires protection of the aquifer from land application of wastewater (see EPA Mitigation Strategy, below).

Finally, EPA can indirectly identify potential water quality problems through the RCRA (1976). This act allows EPA to inventory and establish storage, treatment and disposal regulations for over 85 waste streams and 400 chemical discards. These regulations are aimed primarily at control of industrial and commercial operations dealing with hazardous wastes. Domestic wastewater is excluded from RCRA control, but sludges are not. All industries in the Coeur d'Alene area that generate, store, treat or dispose of any of these hazardous wastes must register with EPA. This registration process, along with Coeur d'Alene's inventory of industrial and commercial wastewater hookups, will allow EPA to identify potentially hazardous materials in wastewater effluent.

EPA Mitigation Strategy. There are no formal federal regulations or EPA policies for control of wastewater disposal over a sole source aquifer. Regulations are being developed on a national level but are incomplete. There is a set of general regulations for land disposal of wastewater over a subsurface water supply (Alternative Waste Management Techniques for Best Practicable Waste Treatment Technology, Federal Register, February 11, 1976), which establishes minimum protection of a sole source water supply. In response to a letter from the PAC regarding Coeur d'Alene's facilities planning, EPA Region X issued preliminary guidance for entities seeking to dispose of wastewater on lands over the Rathdrum Prairie aquifer (U. S. EPA, pers. comm.). This guidance, in effect, establishes a mitigation scheme for potential groundwater quality impacts. The contents of this guidance are summarized as follows:

- In the facilities plan, present ambient groundwater quality data relative to the MCLs in the NIPDWR and other pollutants of concern.
- Identify recent surface activities upgradient from the proposed disposal site that might have later adverse effects on groundwater quality.
- Plan for effluent quality monitoring prior to land disposal.
- Establish and maintain an industrial connections inventory consistent with EPA's pretreatment requirements.
- Establish EPA-approved monitoring wells - one upgradient and two downgradient from disposal site.

- Sample monitoring wells for all MCLs and other identified pollutants from the priority pollutant list prior to land discharge (see Appendix B for priority pollutants).

- Monitor wells quarterly (or less often if justified) for MCLs, total trihalomethane potential or trihalomethanes (if effluent chlorinated), and other priority pollutants found in initial effluent monitoring.

- Monitor for all priority pollutants at each well once annually.

- Monitoring program is to be continuous throughout the life of the project.

- Monitoring program developed by the city must be approved by EPA prior to award of Step 3 grant.

- Facilities plan must predict the soil treatment capabilities of the unsaturated zone at the proposed disposal site.

- Comply with Clean Water Act pretreatment requirements and control all industrial or other waste discharges that might impact MCLs or priority pollutant parameters.

- Wastewater application rates not to exceed 2.3 inches per week (applied over a period of days).

If the above-described monitoring program indicated that degradation was occurring, EPA would require added treatment, tighter controls over dischargers to the system, prohibition of certain surface activities, or provision of an alternative effluent disposal system (U. S. EPA, pers. comm.).

It should also be noted that the list of MCLs may be expanded in the future and the pending sole source regulations may place more stringent control on federally-funded land application systems (U. S. EPA, pers. comm.).

Land Use Conflicts

Introduction

Potential land use conflicts associated with the proposed wastewater treatment sites and the spray irrigation site are an important issue in this EIS. This section describes the existing land use conditions of the proposed sites and evaluates the potential land use conflicts associated with each site.

Land Use Characteristics of Proposed Sites

Alternative B. The site for Alternative B is in the city's manufacturing/commercial zone adjacent to the Spokane River (Figure 1-2). The city's existing treatment plant is located on a portion of the proposed site. Expansion of the plant site from the existing 3.3 acres to 12 acres would be required under Alternative B. Purchase of private land to the east of the existing site would accommodate the expansion plans. Currently used railroad tracks would separate the two sites.

Although expansion of the present plant site would be compatible with the city comprehensive plan manufacturing/commercial land use designation, other land use demands in the area present potential problems. The city's recent annexation of 8.42 acres to the immediate north and east of the plant for purposes of an office/condominium complex conflicts with plant expansion into the same area. Another potential incompatible land use would result if NIC pursues plans to expand north of River Avenue, adjacent to the treatment facilities. In summary, it appears that expansion at the present plant site would discourage residential/commercial use of adjacent vacant land in the future. Table 2-10 summarizes Site B land use characteristics.

Alternative E. The three potential sites in Alternative E are shown on Figure 1-3. All three sites are located within the industrial land use designation of the county comprehensive plan. These three sites are located in primarily uninhabited areas adjacent to the Spokane River. Site E-1 is in a forested area with a large clearing in the middle of the site (see Table 2-10). Site E-2 rests on the southern section of an adjacent gravel pit. Both Sites E-1 and E-2 have potential access problems as a result of railroad tracks and rugged terrain separating the sites from the highway. Site E-3, located approximately 1 mile downriver, is also situated in a stand of trees. The site nevertheless has good access to adjacent Highway 10.

Table 2-10. Land Use Characteristics of Proposed Wastewater Treatment Sites

Proposed Treatment Site	Planned Land Use Designation	Land Use Characteristics of Site	Land Use Characteristics of Adjacent Area
B	Manufacturing/ commercial	Existing treatment plant/ vacant land, log storage	Northeast - vacant land East - railroad tracks/ vacant land South - mill West - Spokane River
E-1	Industrial	Forested area with clearing	North - railroad tracks/ vacant lands Northwest - gravel pit Southwest - Spokane River South and east - open field
E-2	Industrial	Gravel pit	North - railroad tracks/ vacant land Northwest - gravel pit operations East - forested area Southwest - Spokane River
E-3	Industrial	Forested Area	North - Highway 10 West - open land/lumber operations South - Spokane River East - forested and va- cant area

Proposed Treatment Site	Planned Land Use Designation	Land Use Characteristics of Site	Land Use Characteristics of Adjacent Area
G - Ramsey Road	Transition	Alfalfa and grass seed cropland	Sparsely scattered residences on all sides
G - Prairie Ave.	Transition/ agriculture	Alfalfa and grass seed cropland transected by irrigation ditch	Sparsely scattered residences on all sides
G - Huetter Road	Agriculture	Alfalfa and grass seed cropland transected by irrigation ditch	Sparsely scattered residences on all sides

Future land use between these sites is expected to be industrial according to the county comprehensive plan. The construction of a new wastewater treatment plant at any of these sites should therefore be compatible with adjacent land uses. It should be recognized, however, that other types of uses might occur on this riverfront property. Residential and commercial uses are now being planned along the river just 1 mile upstream. If this type of development continues to be attracted to riverfront property, land use conflicts similar to those now being experienced at the present treatment plant could eventually occur at the Alternative E sites. The long-term plans for riverfront areas adjacent to the Alternative E sites should therefore be considered before moving the plant to this area.

Alternative G. Under Alternative G, one of three proposed treatment and storage sites as well as spray irrigation site would be used in conjunction with the existing treatment plant. The proposed sites are located primarily outside the facility planning area in unincorporated rural Kootenai County (Figure 1-5). All of the proposed sites (Ramsey Road, Prairie Avenue, Huetter Road and the spray irrigation site) are currently under agricultural production (mainly alfalfa and grass seed production). Scattered residences are located adjacent to the sites.

Wastewater treatment ponds and spray irrigation on the proposed sites would be compatible with the county comprehensive plan agricultural and industrial land use designations in the airport area, but could conflict with the transition zone lying west of Ramsey Road. Transition areas could eventually be developed for residential use. In addition, continued use of the existing treatment site under this alternative could discourage future commercial/residential use of adjacent vacant land in that area.

Potential Land Use Conflicts

The land uses surrounding the proposed wastewater treatment and spray irrigation sites are presented in Table 2-10. The operation of treatment and disposal facilities could result in adverse impacts to humans using adjacent land. The environmental impacts include: odor generation, noise generation, and visual appearance. The following section describes these factors and evaluates the potential impact associated with each proposed site. In addition, potential mitigation measures are discussed.

Direct Environmental Factors.

Odor Generation. In general, the main source of conflict with wastewater treatment plants is odor generation. Odors can emanate from different odor-producing points at the plant, such as headworks, treatment basins or sludge-handling facilities. Proper design and operation are principal factors in determining if a treatment plant will emit odors. The degree of obnoxiousness of odors depends not only on the concentration of the odor and on the person exposed to the odor but also on the intensity of the odor.

The impact of odors is largely determined by prevailing winds. In the Coeur d'Alene region, winds from the west and southwest are predominant, especially in summer when high temperatures present additional odor problems. Winds from the northeast often occur in winter months (U. S. Army Corps of Engineers, 1976, Appendix E).

Noise Generation. Typically, adverse noise impacts are associated with the operation of treatment plants. Objectionable noise levels result primarily from trucking activity to and from the plant. Similar to odor impacts, prevailing winds play a key role in the degree of impact. Other factors such as frequency of noise impact, level of noise impact, and individual perception are important considerations.

Visual Appearance. Wastewater treatment plants often impose adverse visual impacts on surrounding areas. Although the degree of impact is dependent on individual perception, the visual appearance of treatment plants is often in contrast to the surrounding environment. This can result in an adverse aesthetic impact on a neighborhood or nearby road.

Site Evaluation. The potential direct land use conflicts associated with each proposed treatment site are presented in Table 2-11. The sites were evaluated in terms of odor noise, and visual impacts. The degree of impact (i.e., high, moderate or low) was based on the proximity of the sites to existing residential and highway uses and the potential frequency of impact.

As indicated in Table 2-11, all of the proposed treatment sites, with the exception of Site B, have a relatively low potential for direct land use conflict. The remoteness of these sites from other human activities accounts for the "low" designations. On the other hand, expansion of treatment facilities at Site B would likely aggravate existing odor problems and aesthetic detractions. Expansion of the plant would encroach upon a nearby residential area and would probably result in an increase of odor complaints.

Table 2-11. Potential Direct Land Use Conflicts Associated With the Operation of the Proposed Treatment Facilities

Treatment Facility Site	Direct Environmental Factors								
	Odor Impact			Noise Impact			Visual Impact		
	High	Medium	Low	High	Medium	Low	High	Medium	Low
B	x				x		x		
E-1			x			x			x
E-2			x			x			x
E-3			x			x			x
G - Ramsey Road*		x				x			x
G - Prairie Ave.			x			x			x
G - Huetter Road			x			x			x

*G - sites only consider treatment ponds and storage.

The preceding analysis examined potential land use conflicts from the viewpoint of existing land uses. If potential land use changes are considered, certain other conflicts become apparent. As mentioned, future land use demands in the area surrounding the existing treatment plant could result in additional land use conflicts if Alternative B is selected. Similarly, land use conflicts could develop at the downriver sites in 10 or 15 years as a result of competing land use demands and continued downzoning practices. It appears, therefore, that even though the selection of Alternative B would present some immediate land use problems, selection of one of the Alternative E downriver sites might also result in land use conflicts in the long term.

Mitigation Measures. The adverse environmental factors identified in Table 2-11 can be controlled. This would minimize objections to the treatment facilities. In some cases direct adverse effects can be significantly reduced by buffer zones. This could alleviate adverse visual impacts and help dissipate undesirable noise and odors. In other cases, however, additional measures are necessary. Table 2-12 identifies other potential mitigation measures.

Influence on Soils and Crops

Alternative G calls for irrigation of wastewater between mid-April and mid-October of each year north of Coeur d'Alene (Figure 1-5). The new north area treatment lagoon complex would provide secondary treatment for about 2.2 MGD of wastewater in the initial project phase. In 1995 the capacity would be increased to 3.8 MGD. The total irrigated acreage would eventually reach about 850 acres, with the estimated effluent application rate of 5 inches per month or 30 inches per season. The annual nitrogen loading is estimated to be 200 pounds per acre per year. The wastewater would be applied to a field crop, probably grass, for either seed or hay production (Brown and Caldwell, pers. comm.).

This type of wastewater reuse can lead to eventual soil and crop damage from a build-up of salts or other dissolved materials. Wastewater contains much higher concentrations of salts than local well water. The critical water quality parameters for most agricultural irrigation, according to the University of California Committee of Consultants, includes electrical conductance, sodium adsorption ratio (SAR), sodium, chloride, boron, ammonia, nitrate and bicarbonate (Ayers, 1977). Neither the city nor the IDHW regularly monitor the city's effluent for most of these parameters.

Table 2-12. Potential Mitigation Measures for Land Use Conflicts

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Odor Reduction

1. Ensure that all facilities are properly maintained, including all odor control equipment (digester covers, etc.).

2. Establish a means of monitoring plant odor production so that any off-site impacts can be rapidly detected and corrective action can be taken.

3. Locate treatment plant away from residential and commercial areas.

Noise Reduction

1. Restrict truck traffic to the hours between 9:00 a.m. and 5:00 p.m.

2. Enclose all pumps and motors in acoustically designed structures.

3. Maintain a berm around all treatment facilities.

Visual

1. Maintain a berm around all treatment facilities.

2. Plant shrubs and trees around treatment facilities.

Data are available only for electrical conductance, ammonia and nitrate. The city's facilities plan does not predict effluent quality for these parameters under Alternative G treatment because Alternative G is not being actively pursued by the facilities planners. Table 2-13 summarizes existing effluent data and the irrigation water quality guidelines.

Because the effluent data are so limited, it is difficult to predict the soil and crop impacts created by Alternative G. The low level of salts in the present Coeur d'Alene effluent, the high quality of local water supplies, and the extremely porous nature of the disposal area soils suggest that the irrigation scheme would not lead to a sharp loss in soil permeability or result in salt damage to the grass or hay crop. Even though the expected nitrate + ammonia levels fall in the general guidelines category of increasing problems, grass and hay crops are not extremely sensitive to nitrogen compounds. A review of local water supply quality data (Panhandle Health District, 1977) indicates that boron, sodium and chloride would probably not occur in Coeur d'Alene's effluent in quantities large enough to damage grass crops, but this is speculative without actual effluent quality data.

Even though it is not likely that the irrigation proposal would cause crop or soil damage, there are several steps that could be taken to further ensure a successful operation if Alternative G were implemented. The effluent application rate should not exceed the area's normal evapotranspiration rate by more than 25 percent. This will reduce the chances of creating a shallow water table. The 5-inch per month application rate described by Brown and Caldwell meets this stipulation. Also, sufficient drying periods should be allowed so that root saturation or soil clogging do not become a hazard to the crop. It would also be valuable to test the Coeur d'Alene effluent for boron, sodium and chloride prior to pursuing Alternative G, so that the potential soil and crop impacts could be more accurately predicted.

Public Health Risks On and Around the Spray Disposal Area

Facilities plan Alternative G includes spray disposal of a portion of Coeur d'Alene's wastewater on agricultural land north of the city (Figure 1-5). Up to 5 inches per acre per month would be sprayed over a grass crop, from mid-April to mid-October. None of the other project alternatives propose this land application process.

Table 2-13. Irrigation Water Quality Guidelines

Parameter	Irrigation Water Quality Guidelines[1]		Present Effluent Quality[2]	Predicted Alternative G Effluent Quality[3]
	No Problem	Increasing Problems		
Electrical conductance (mmhos/cm)	< 0.75	0.75-3.0	.45	
SAR (adj)[4]	< 6.0	6.0-9.0		
Sodium (mg/l)[5]	< 69	>69		
Chloride (mg/l)[5]	< 106	>106		
NH_4-N + NO_3-N[6] (mg/l)	< 5	5-30	14.2	12-15
HCO_3 (mg/l)	< 90	90-520		
Boron (mg/l)	< 0.5	0.5-2.0		

[1]Ayers, 1977.
[2]Idaho Department of Health and Welfare, pers. comm. (average of 6 individual samples taken from January 1980 to June 1980).
[3]Bain, pers. comm.
[4]Sodium adsorption ratio.
[5]Specific toxicity from foliar absorption.
[6]Recommended limits for sensitive crops.

Spray disposal of treated wastewater can create a health risk to persons on or adjacent to the disposal area. Biological agents (virus, bacteria) typically found in treated wastewater can cause illness or disease in humans. The two most typical means of infection are inadvertent ingestion by drinking water contaminated by wastewater and inhalation of wastewater aerosols created during spraying.

Inadvertent ingestion (e.g., drinking) can be effectively avoided in most cases by fencing disposal areas and posting signs that warn of the hazard. All water spigots, pipes and nozzles can be marked with warnings. The site can also be designed to keep wastewater runoff from leaving the area. The chance of persons accidentally or intentionally wandering onto a spray site can also be reduced by selecting an isolated disposal area. The facilities plan identifies a large acreage north of Coeur d'Alene and west of Hayden that could be used for irrigation disposal of effluent. Eventually 1,000 acres would be needed to dispose of the expected flow (maximum of 3.8 MGD). The farther north and west the irrigation site, the more isolated it would be from residential areas. The land west of the airport would be the most buffered from existing and proposed development.

The health risk from aerosols is more difficult to control. Isolation, use of vegetative screens, maintaining buffer strips, fencing of the spray area and adequate disinfection of the wastewater are the most effective safeguards.

Studies by Sepp (1971) found that aerosols from typical sprinkler systems can travel over 500 feet in 6-7 mile per hour winds. The distance increases to about 1,300 feet in 11-mile-per-hour winds. Most of the mists fall out within half of these maximum distances. Many of the pathogens found in wastewater are capable of surviving in these aerosols, so the importance of isolation and buffer strips are evident.

Additional protection from aerosol drift can be achieved by a variety of operational measures: low trajectory and low pressure sprinkler heads should be used to keep fine aerosols from forming and drifting off of the site; irrigation should cease during periods of high winds. This latter measure would be especially important because the prevailing wind direction is from the west and southwest; this would carry aerosols toward the populated areas which are generally to the east of the proposed irrigation area. Again, the land to the west of the airport would provide the greatest buffer between the irrigation operations and developed or potentially developed land.

Project Economic Influences

Direct Project Costs

If no new wastewater facilities are constructed for Coeur d'Alene, no immediate increases in capital expenditures would be incurred. The city would continue to operate its present plant at an estimated annual operation and maintenance cost of $346,000 per year. The monthly user charge for this wastewater service is $4.48 (Brown and Caldwell, 1980). However, if flows into the plant increase with no improvement in the structural integrity or capacity of the plant, wastewater discharge violations are likely to increase. This could ultimately lead to fines and/or flow restrictions enforced by IDHW or EPA. The fiscal implications of this type of regulatory action could eventually affect the entire community.

Capital costs of facilities required for the action alternatives through year 2005 are shown in Table 2-14. As shown, Alternative B has the lowest capital cost, Alternative E the next lowest, and Alternative G, the highest capital cost. The local share of the initial construction cost is estimated to be (for secondary treatment only) $1,775,000 for Alternative B, $1,948,000 for Alternative E, and $3,175,000 for Alternative G. Local share capital costs with phosphorus removal added were not shown in the facilities plan (Brown and Caldwell, 1980).

Present worth costs, which express the present worth cost of constructing and operating the facilities until year 2005 are shown in Table 2-15.

The estimated monthly user costs for each of the alternatives in year 1983 are: Alternative B - $11.59 per month; Alternative E - $12.16 per month; and Alternative G - $16.10 per month. These costs include an increment for the cost of phosphorus removal facilities (Brown and Caldwell, 1980).

Brown and Caldwell (1980) has recommended that the local share of treatment system construction costs be financed by selling general obligation bonds. They suggest that if Alternative E is to be implemented, approximately $2.5 million in bonds should be sold. The pay-back period would be 20 years. The cost of bond repayment, as well as the cost of treatment system operation and maintenance, is reflected in the monthly user charges listed above.

The facilities plan intentionally separated treatment plant cost considerations from the cost of improving and expanding the city's wastewater interceptor network. The plant identifies $1.9 million in near-term and $3.2 million in long-term collection system costs (Brown and Caldwell, 1980). These costs are in addition to those described in the previous narrative and tables. The various interceptor segments and costs are listed in Table 1-2. The interceptor extensions are mapped in Figure 1-6.

Table 2-14. Capital Cost of Facilities to Provide Capacity to 2005 (Millions of Dollars)

Item	Alternative		
	B	E	G
Treatment facilities			
Upgrade existing plant	1.01	---	4.09
1985 new facilities	12.33	12.32	3.15
1995 new facilities	6.44	6.44	2.10
Treatment plant site	0.06	0.60	1.12
Effluent disposal			
Outfalls and land	0.12	0.14	5.65
1985 irrigation equipment	---	---	2.79
1995 irrigation equipment	---	---	1.55
Collection system			
Pump stations, storage	---	1.82	2.79
Force mains	---	.58	1.32
Gravity	---	---	2.17
Total project cost - secondary treatment	19.96	21.90	26.73
Phosphorus removal - additional cost (1985)	.28	.28	.14
Total project cost - secondary + phosphorus removal	20.24	22.18	26.87
Nitrification - additional cost (1985 + 1995)	.98	.98	---
Total project cost - secondary + phosphorus removal + nitrification	21.22	23.16	26.87

SOURCE: Modified from Brown and Caldwell, 1980.

Table 2-15. Present Worth Cost of Capital Facilities and Operation and Maintenance (Millions of Dollars)

Item	Alternative		
	B	E	G
Secondary treatment	20.19	23.16	26.57
Phosphorus removal	1.91	1.91	0.71
Subtotal - secondary + phosphorus removal	22.10	25.07	27.28
Nitrification	.88	.88	0
Subtotal - secondary + phosphorus removal + nitrification	22.98	25.95	27.28

SOURCE: Modified from Brown and Caldwell, 1980.

Wastewater collection system extensions are typically financed solely by the local entity. State and federal grants are seldom involved. However, Brown and Caldwell (1980) has suggested that federal and state grant assistance might be available for those interceptors picking up existing waste flows that might be adversely affecting the Rathdrum Prairie aquifer. This includes interceptors to the local high school and the fairgrounds. A decision has not yet been made on the grant eligibility of these elements. The local cost of interceptors will probably be financed by forming local utility improvement districts, so that those benefiting from the extension of sewers in specific locations will also pay for the service.

Economic Impact on Property Values

Wastewater facilities have both direct and indirect economic impacts on property values. Direct economic impacts occur where property values are affected by the property's proximity to wastewater treatment plants. Residential property values are most affected since residential land uses are generally incompatible with treatment plant operations. Negative externalities associated with the operation of treatment plants include odor generation, noise generation, and visual detraction. Properties located in closest proximity to the plant and in the direction of prevailing winds are most impacted.

In the Coeur d'Alene planning area, residential properties adjacent to the existing treatment plant are subject to adverse environmental impacts. Expansion of the plant under Alternative B would likely increase the extent of adverse impacts. As a result additional negative economic impact on surrounding property values would occur. The property value of the industrial area surrounding the proposed sites in Alternative E would appear to be unaffected. The impact on property values adjacent to Alternative G sites would probably be minimal, if any, assuming existing land use conditions persist.

Indirect economic impacts on property value occur as a result of the impact of sewer availability on the development potential of an area. In general, public investments have significant positive effects on land values since, in the absence of such investments, development potential is limited. Where property values increase because of sewer availability, indirect public benefits result.

The increase in property values creates additional wealth for an area and stimulates local economic activity. As a result incomes increase, which provides additional tax revenues and results in improved government services to the community. Therefore, a decrease in property value of residential land near the treatment plant should be evaluated in relation to increased land values in other parts of the area.

Use of Scarce Resources

Conventional centralized wastewater treatment systems use energy in the form of electricity and natural gas and consume certain chemicals in treating and disinfecting wastewater. This use of often scarce energy and chemicals is important because the production of these materials in turn requires both financial and energy expenditures. Their production also creates a variety of impacts on the environment. Therefore, it is advantageous to consider the use of energy and chemicals when evaluating wastewater alternatives.

Energy

The Coeur d'Alene wastewater plant is presently using about 500,000 Kwh of electricity annually (Brown and Caldwell, 1980). The Washington Water Power Company supplies this power. Under the "no-action" alternative, this energy use would continue into the future, as wastewater flows would increase only slightly due to plant capacity limitations. The projected electrical energy consumption of the action alternatives is summarized below.

Table 2-16

Projected Electrical Energy Consumption
(Kwh/year)

Alternative	1985	1990	1995	2000	2005
B	556,000	738,000	955,000	1,208,000	1,482,000
E	655,000	861,000	1,135,000	1,443,000	1,798,000
G	1,256,000	1,865,000	2,523,000	3,271,000	4,442,000

SOURCE: Lange, pers. comm.

The totals in Table 2-16 are just for secondary treatment, but only minor increases would be needed for phosphorus removal or nitrification processes because pumping requirements are not significantly different (Brown and Caldwell, 1980).

Alternative B, which requires the least amount of wastewater pumping, has the lowest electrical energy demand. Alternative E is slightly higher because wastewater must be pumped downriver to the new treatment site. Alternative G has by far the greatest demand because a large volume of wastewater must be pumped up to the Hayden area and wastewater must be pumped into the irrigation system to provide adequate spraying pressure.

Brown and Caldwell (1980) also estimated the total energy demand for each alternative. This includes both direct electrical use and the energy required to produce and transfer energy and chemicals to the treatment site. Specific numbers were not listed, but the requirements were graphed. A rough estimation of those total numbers for 1985 and 2005 follows:

	Energy Required Annually in BTU x 10^9	
	1985	2005
Alternative A	6.25	6.25
Alternative B	6.875	17.5
Alternative E	10	30
Alternative G	13.75	45

Again, Alternative B shows the lowest demand and G shows the highest demand of the action alternatives.

The Washington Water Power Company (WWP), which supplies electrical and natural gas energy to the area, should be able to provide the necessary power. However, because WWP has not been able to increase its hydroelectric power generating capacity in recent years, its electrical energy supplies have been stretched quite thin, especially in dry years (Witter, pers. comm.). For this reason, WWP has encouraged installation of utilities that use natural gas wherever possible. The area's natural gas supply, which is primarily from Canada, is presently more capable of meeting demand increases.

Treatment-related demands on outside energy sources can be kept to a minimum in a variety of ways. The most obvious is to select treatment processes and plant locations that generate the least demand. As stated above Alternative B has the lowest demand. Other actions can also reduce demand. Energy-efficient equipment can be purchased. Methane gas generated during sludge digestion can be used to meet plant natural gas requirements. Chemical dosing can be closely monitored to limit chemical use, thereby indirectly reducing energy consumption. Brown and Caldwell has identified another potential energy mitigation for Alternative E. Idaho Forest Industries is considering construction of a wastewood-fired steam generating plant near Atlas. If this was eventually constructed and the treatment plant was moved to that area, the sewage sludge might be incinerated with the woodwaste. This could increase the energy output of the generator and reduce the energy needed to dewater and haul sludge to the landfill site. This possibility is only speculative at this point.

Chemicals

Each of the project alternatives, including "no-action", would use chlorine for wastewater disinfection and Alternatives B, E, and G would use alum for removing phosphorus. Presently, the Coeur d'Alene plant uses 24,000 pounds of chlorine per year (Brown and Caldwell, 1980). Alum is not used. Under the "no-action" option, this situation would remain the same. Projected chemical use under the action alternatives is summarized below.

Table 2-17

Projected Chemical Usage

Alternative	1985	1990	1995	2000	2005
Chlorine-lbs/yr					
B	25,000	32,000	41,600	51,500	61,300
E	25,000	32,000	41,600	51,500	61,300
G	25,000	32,000	41,600	51,500	61,300
Alum-gal/yr					
B	84,000	106,000	139,000	172,000	204,000
E	84,000	106,000	139,000	172,000	204,000
G	47,000	55,000	65,500	76,000	84,000

SOURCE: Lange, pers. comm.

Chlorine usage would be the same for each action alternative because disinfection of all wastewater would be necessary regardless of the treatment process or disposal mode. Alum requirements are similar for Alternatives B and E because year-round river discharge of wastes would occur with both alternatives and phosphorus removal would be necessary from mid-April to mid-October. Under Alternative G, wastewater from the north section of town would be disposed of on land during the summer. This increment of flow (3.8 MGD by 2005) would not need to be treated for phosphorus removal. Therefore, the alum requirement would be lower.

Chemical use can be kept to a minimum by closely monitoring dosing and using only the amount needed to meet NPDES effluent quality requirements. If alternative disinfection or phosphorus removal methods were used, the need for chlorine and alum might be eliminated, but other resources would probably be used instead. The proposed treatment methods have been recommended by the facilities plan engineers as the most reliable and cost-effective.

Archeological Resources

Cultural Resources Survey

Significant archeological property is located adjacent to the Spokane River at Coeur d'Alene, near proposed sites for Alternative B and probably E. An historic cultural site, including the largest traditional head village of the Coeur d'Alene tribe, is situated at the junction of the river and Cougar Bay. The site extends downstream for an undetermined distance along the shore. The extent of habitation downstream is difficult to determine, because "on navigable water, every beach is a site" (Moratto, 1979). It is known, however, that three villages (in addition to the head village) were located along the first several miles of river.

Native use of the river and lake shore near proposed Sites B and E is well documented. The area was an important fishing and fish processing center, and several burials have been unearthed in the vicinity. Test excavations on the North Idaho College campus and Blackwell Island indicate cultural deposits up to 39 inches in depth; most areas adjacent to the river probably contain a prolific cultural record. Fort Sherman recently was placed on the National Register of Historic Places, and a second property (prehistoric Site 10-KA-48) located at the mouth of the Spokane River appears to be eligible for the register. In contrast, there is no evidence of significant cultural resources near proposed Alternative G or its associated irrigation sites.

Mitigation

Although no mitigations are currently anticipated for the Alternative G Site, any excavation or ground-disturbing activity could potentially reveal significant archeological resources. Should cultural materials be unearthed, excavation should cease until a qualified archeologist is consulted. It also is recommended that an archeologist be present during excavation of the interceptor routes north of the city, until the presence or absence of artifacts can be determined.

For Alternative E, Site option 2 (now a quarry) would require no mitigation because most original site materials already have been lost. Site options 1 and 3, however, probably have extensive intact cultural records. It is recommended that these areas be left undisturbed or that test excavations be conducted to determine appropriate mitigative actions. The interceptor route parallel to the river also would require additional investigation.

The University of Idaho Laboratory of Anthropology, which conducted the archeological survey, suggests that disturbance of land planned for Alternative B should be avoided if at all possible. If B is selected for implementation, an extensive testing program should first be conducted to evaluate eligibility of the site for the National Register of Historic Places.

Coordination of the archeological resources investigations with the Idaho State Historic Preservation Officer, as required by Section 106 of the National Historic Preservation Act, is documented in Appendix A.

Growth Implications

Introduction

This section of the report describes the population growth assumptions used in the facilities plan, compares those assumptions with other local and state population projections, and indicates the type of indirect environmental impact that may result if growth occurs as described in the facilities plan.

Analysis of Facilities Plan Population Projections

Introduction. Population projections prepared as part of 201 facility plans are used to determine projected flows which are the basis for the sizing of wastewater treatment facilities. In addition, grant funds from state and federal sources are dependent on these projections. Since 20 years of growth are planned for in facility plans, many assumptions about future population conditions must be made. It is important to employ sound analytical methods so that projections are as reliable as possible.

Comparison of Alternative Local Population Projections for Coeur d'Alene. Population projections for the Coeur d'Alene area have been prepared by Kootenai County, Idaho Department of Health and Welfare (IDHW), Coeur d'Alene Planning Department, Panhandle Area Council, and Seidman and Seidman for the Idaho Bureau of State Planning and Community Affairs. These projections are presented in Table 2-18. In addition, preliminary 1980 census figures are presented.

A variety of projection techniques were used in the preparation of the projections in Table 2-18. For example, Kootenai County used an arithmetic (straight-line) approach; based on a constant population increase, the IDHW used a population and employment forecast model; and the Coeur d'Alene Planning Department applied a geometric progression method based on two different growth rates. Each projection method was based on certain key assumptions about growth.

Description of Facilities Plan Population Projections. The method used to project population for the facilities planning area incorporates independent projections for the City of Coeur d'Alene and the unincorporated portion of the planning area. For the City of Coeur d'Alene, projections prepared by the city planning department in 1977 were found to be most accurate in comparison to a dwelling unit count conducted by the city in 1979. Therefore, city planning department projections based on a geometric increase of about 2.3 percent per year were used. This resulted in a population projection of 33,590 for Coeur d'Alene in the year 2000.

Table 2-18. Alternative Population Projections for the City of Coeur d'Alene

Population Projection	1975	1976	1977	1980	1985	1990	1995	2000
IDHW		18,194		22,288		32,531		42,755
County	17,994			19,761	21,528	23,295		
City	17,994							
- straight 2.8%				20,658		27,228		
- straight 2.2%				19,964		24,576		
- geometric				20,333		26,306		33,590
PAC (208) plan	17,994			19,761	21,528	23,295	25,062	
Seidman and Seidman			20,500	22,400	25,500			
1980 census (preliminary)				20,019				

SOURCES: IDHW, pers. comm.; Kootenai County, 1977, Table IIC; City of Coeur d'Alene, pers. comm.,; PAC, 1978; Seidman and Seidman, 1978, Exhibit 7-1.

To project the population for the unincorporated portion of the planning area, the growth rates from 1970-1977 in the three encompassing county enumeration districts were first determined. The combined growth rate was estimated at 130 percent during that period. On an annual basis, this represents a 12.5 geometric increase or an 18-3 percent arithmetic increase. These annual rates were then applied over a 20-year period to the existing population (4,160) determined from a 1979 dwelling unit count by Kootenai County. This resulted in a range from 19,400 persons (arithmetic) to 43,900 persons (geometric) in the year 2000 for the unincorporated portion of the planning area.

To avoid double counting of projected populations in the planning area as a result of additional annexations, municipal boundaries in the year 2000 needed to be specified. Since the existing population density (2,880 persons per square mile) was assumed to be desirable and appropriate for the year 2000, the projected increase in the city's population (12,100 persons) would consume (based on existing population density) an additional 4.2 square miles of the unincorporated portion of the planning area by the year 2000.

The annexation of 4.2 square miles (assumed to occur adjacent to city boundaries) accounts for 39 percent of the 10.75 square miles in the unincorporated portion of the planning area. Based on present densities and on conversations with local planning agencies, the facility planners considered 50,000 to be a reasonable projection for the planning area for the year 2000. This estimate results in 16,410 persons residing in 6.55 square miles of the unincorporated portion of the planning area in 2000.

Analysis of Methods. The selection of a 2.3 percent growth rate in the facilities plan for population projections in the city appears reasonable in relation to past growth rates. However, it is important that this growth rate accurately reflect future growth conditions. Preliminary results from the 1980 census show that population growth in Coeur d'Alene has slowed. Projections in the facilities plan used base population data of 21,400 persons (1979) supplied by the city planning department. Recent census information shows a 1980 population of 20,019 or approximately 7 percent fewer persons 1 year later. The impact of this lower actual population on the selected projection method would be to decrease the growth rate to 2.2 percent. This would result in a year 2000 population of 30,669 or 2,921 fewer persons. This translates into a 24 percent reduction of the projected population increase (12,190) over the 20-year period.

The economic slowdown has been identified as a major cause in the recent dip in population growth rate. If the impacts of the slowdown prove to be only short term, and a high level of economic growth returns, then the projected growth levels would result.

For the unincorporated portion of the planning area, extrapolation of past growth trends for 20 years hence does not appear reasonable. Although the encompassing county enumeration districts did experience a 130 percent increase or 12.5 percent annual increase in population from 1970-1977, this rate can be discounted for future use for several reasons. First, this rate reflects an increase from a relatively small population base (3,048) in 1970 to 6,946 in 1977 for an absolute increase of 3,898 for the 7-year period. For growth to continue at this exponential rate, the factors which stimulated the initial growth such as jobs, housing, and other amenities must also continue to increase at a similar rate (12.5 percent) over the 20-year period. This appears to be unlikely. Second, rapid short-term growth in the unincorporated portion of the planning area is constrained by existing development policies designed to protect the water quality of the aquifer. Presently, densities are restricted to one unit per 5 acres outside the approximate city limits. These density limitations are planned to be removed only gradually as infill occurs.

Consistency of Facilities Plan Population Projections with EPA-Approved Population Projections. EPA's policy on funding wastewater treatment facilities requires that facility plans be consistent with population projections used in approved areawide water quality management plans or those projections developed by the state. The population projections prepared for the areawide water quality management plan were determined by the PAC to be out-of-date. Therefore, consistency of the facilities plan population projections with state projections is examined.

The EPA-approved state projections were prepared by the IDHW. The IDHW projection for the City of Coeur d'Alene in the year 2000 is 42,755 (Table 2-18). The facilities plan projection for the City of Coeur d'Alene in the year 2000 is 33,590. The discrepancy is explained as the result of different levels of annexations. Although these two projections are inconsistent, EPA policy only requires that the facilities plan projections be equal to or lower than state projections; therefore, the consistency requirement has been met.

A problem arises, however, when the population projections for the total facility planning area are considered. The facilities planners estimate that approximately 16,000 persons out of a total of 50,000 will reside in the unincorporated portion of the facilities planning area in the year 2000.

For the state projections to be consistent with facilities plan projections, it must be assumed that approximately 7,000 of the 23,500 persons that the state has projected to reside in the unincorporated portions of Kootenai County in the year 2000 would be allocated to the area outside of the Coeur d'Alene city limits but within the facilities planning area. Although it has allocated a population increase of 23,500 to the unincorporated areas, the state has not specified as yet the actual location of these new residents. This assumption, therefore, cannot be verified until the state completes allocation of the projected population increase to specific areas of the county.

Growth Inducement and Land Use Impacts

Introduction. Projected growth over the next 20 years in the facilities planning area is predicated on the existence of certain growth factors. One important factor is the availability of sewer service. To evaluate the effect of sewer extension on projected growth, likely growth conditions in the absence of sewers should be considered. If sewers are not extended in the Coeur d'Alene facility planning area, allowable housing densities would be maintained at a maximum of one dwelling unit per 5 acres outside the SMP area, according to PHD regulations. This would significantly reduce development potential.

From a local perspective, the sewer system expansion for the City of Coeur d'Alene can be considered growth-inducing in that projected growth rates would be significantly lower in the absence of a sewer system. The extension of the sewer system can thus be considered as the removal of a local constraint to growth. From a regional perspective, Coeur d'Alene is viewed as the economic center of the region. If the sewer system is not expanded, growth in the Coeur d'Alene planning area would be significantly lower. It is unlikely that the other urban areas in the region could attract or accommodate all the growth projected for the Coeur d'Alene planning area. Some of the projected growth, therefore, would be likely to move out of the region, possibly to the Spokane area. The extension of sewers in the Coeur d'Alene planning area can therefore be considered growth-inducing on a regional level.

Land Use Plans and Policies. The four government agencies with the greatest effect on land use policy in the Coeur d'Alene planning area are the City of Coeur d'Alene, Kootenai County, the PAC, and the PHD. Land use plans and policies of these agencies are summarized below.

City of Coeur d'Alene. The City of Coeur d'Alene Comprehensive Plan was prepared originally in 1977 but has recently been revised (adopted in August 1980). The comprehensive plan is essentially a policy plan with a map delineating land use classifications and allowable densities (Figure 2-3). The area identified in the map is the area of city impact and closely corresponds with Coeur d'Alene's facility planning area. The land use map will be reviewed in the following section.

Policies in the plan of particular importance to future growth and land use conditions include annexation policies. These policies recommend that expansion of the city be in conformance with the urban service area. In addition, policies on the provision of sewer service recommend that existing areas within the city be given priority in sewer service. These policies also recommend that a consistent policy be formulated for serving areas outside of present city limits but within the city impact area.

Kootenai County. The Kootenai County Comprehensive Plan was adopted in December 1977 and is currently being updated. The plan includes time-phased population projections and a land capability analysis.

The county plan presents few specific land use policies, but it does contain broad goals and objectives. Several of these goals and objectives encourage the retention of agricultural land in agricultural use; one objective encourages productive agricultural land protection by selectively eliminating the availability of public utilities (water and sewer) to agricultural areas. Other plan goals and objectives encourage development within and contiguous to existing urban areas, and encourage planning for water and wastewater facilities to be consistent with anticipated population growth.

The generalized land use plan map appended to the plan incorporates the land use policies and is intended to guide land use decisions. This map shows continued growth along the Post Falls-Coeur d'Alene-Hayden L-shaped corridor. The currently vacant land between the Cities of Post Falls and Coeur d'Alene is shown as either urbanized or in an urban "transition area".

Panhandle Area Council. The PAC is a voluntary association of local governments, functioning as a regional planning and coordinating agency, within the five counties in the Idaho Panhandle. The PAC is the designated 208 agency for the Rathdrum Prairie aquifer. The initial 208 plan, completed in cooperation with the PHD and the IDHW, contains 30 policies for the aquifer, several of which are directly related to land use and growth. These policies encourage growth to locate within designated community service areas or other areas programmed for future sewer service.

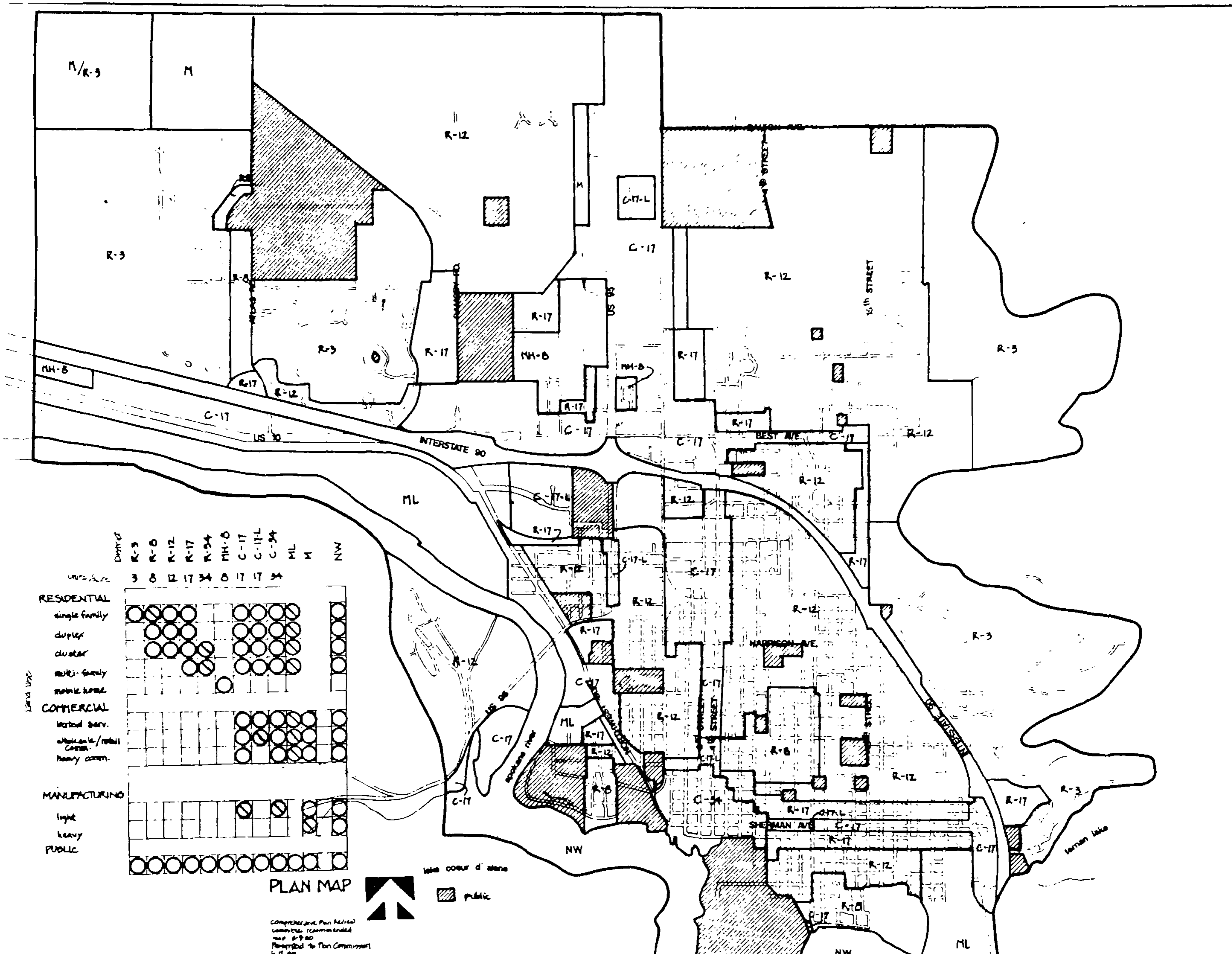

FIGURE 2-3. CITY OF COEUR d'ALENE COMPREHENSIVE LAND USE PLAN MAP

Other aquifer protection policies pertain to floodplain and open space areas. Development using on-site systems is discouraged from locating in the 100-year floodway. Development in the 100-year flood "fringe areas" is encouraged only when it can be sewered by centralized sewerage systems. New developments on the aquifer are encouraged to retain the maximum amount of open space to enhance groundwater recharge and minimize impacts of urban runoff. Sewer interceptors and treatment plants are encouraged to locate so that agricultural, recreational or open space lands are not prematurely open to development. If facilities must be located through these areas, then prohibition of lateral sewer connections is encouraged.

Panhandle Health District. The PHD is involved in land use policy in the planning area primarily through its rules and regulations governing sewage disposal on the Rathdrum Prairie. Regulations are intended to direct development to areas with current or planned centralized sewerage service to protect the Rathdrum Prairie aquifer. Under these regulations, on-site systems on parcels less than 5 acres can be installed only within the sewer management planning (SMP) area which roughly corresponds to the existing city limits. As infill occurs and densities increase, the SMP area could be extended.

Analysis of Existing and Projected Land Use Conditions. Future land use patterns in the facility planning area will emerge as the existing sewer system is extended. This section describes existing land use conditions, evaluates the potential impact on land use as a result of projected growth, and examines the consistency of the projected growth pattern with land use plans.

Existing Land Use. The facility planning area encompasses approximately 17 square miles. This includes 6.5 square miles for the City of Coeur d'Alene and about 10.75 square miles for the unincorporated portion of the planning area (including Fernan Lake). Presently, the unincorporated portion of the planning area is primarily rural with scattered residences. By the year 2000, much of the facility planning area is projected to have a land use pattern similar to the existing pattern in Coeur d'Alene.

According to a 1976 land use survey prepared by the City of Coeur d'Alene, approximately 43 percent of total land use in Coeur d'Alene is residential. Residential areas are located primarily south of I-90 (Figure 2-3). Most of the recent growth, however, has occurred north of I-90 where generally large parcels of land are available. Most new single-family developments are averaging densities in the range of 3-4 units per acre in the northern part of town and 7-8 units per acre for infill developments. Condominiums and multifamily development are averaging approximately 9 units per acre and 18-20 units per acre, respectively (City of Coeur d'Alene Planning Department, pers. comm.). In the last few years, construction of multiple family developments has increased significantly.

Commercial land uses are located primarily in two areas: the downtown area, especially along Sherman Avenue, and the Appleway Corridor. The downtown area has generally attracted commercial services and recreational activities while trade and wholesale uses have mainly located in the Appleway Corridor. In recent years, land use for commercial services has shown the most significant increase in commercial land uses (Coeur d'Alene Planning Department, pers. comm.).

Industrial land is used mainly by the forest products industries. Nearly all of the industrial land is along the Spokane River. Exceptions are: a few gravel pits north of I-90 on Ramsey Road, an industrial park in the northwest corner of the planning area, and a lumber mill on Lake Coeur d'Alene. The vast majority of industrial land uses are located in the unincorporated portion of the planning area.

Major public and semipublic lands include NIC at the outlet of Lake Coeur d'Alene, Tubbs Hill Park, the golf course, a waterfront park at the west end of Sherman Avenue, the county fairgrounds, and several smaller schools and parks.

The City of Coeur d'Alene Planning Department is presently updating its inventory of land uses. Results should be available in December 1980.

Future Land Use. The supply of available unconstrained land in the facility planning area appears sufficient to accommodate projected population growth. Market forces in conjunction with land use constraints will determine where the development occurs.

Population projections prepared as part of the facilities plan were developed, based on observations regarding developable land and the city's comprehensive land use plan. For each sewer subarea identified in Figure 2-4, developable acreage was estimated by calculating the total land acreage and subtracting undevelopable acreage (e.g., city park, schools, and golf courses). The estimated developable land was then reduced by 30 percent to account for street and roadway requirements. Commercial and industrial uses were also considered. The remaining acres were those available for residential use. The population of each subarea was determined by comparing the developable acreage with density designations in the city comprehensive land use plan.

The subareas closest to the city center were allocated the majority of the population in the first 5-10 years. As the city expands, outlying areas were assumed to accommodate an increasing share of the population until densities reflected in the comprehensive plan were reached. Although possible changes in zoning or changes in development pressure were recognized, the impact of these changes was not considered.

Analysis of Consistency of Projected Growth With Land Use Plans. The distribution of future growth as projected in the facilities plan considered land use classifications and allowable densities in the Coeur d'Alene comprehensive plan. The pattern of urban expansion from the central area to the outlying areas is consistent with the city's concept for expansion. The projected rate and extent to which the urbanization of outlying areas will occur, however, is somewhat questionable in light of existing city, county, and PHD development policies.

Of the growth projected between 1980 and 1985, approximately 24 percent is assumed to occur in sewer subareas (Figure 2-4) located fully outside the existing SMP area. An additional 43 percent of the anticipated 1980-1985 growth is projected to occur in sewer subareas which are only partially within the SMP area. Since city and county land use policies strongly encourage infill development, and since the PHD limits development outside SMPs to one unit per 5 acres, it is questionable whether this level of near-term urbanization in the outlying areas could occur.

Longer term land use problems associated with the projected levels of growth will be the management of future populations in the unincorporated portion of the planning area. If growth occurs as projected, over 16,000 persons would be located in the unincorporated portion of the planning area at the year 2000. This projected population is much higher than the level of growth for which Kootenai County is currently planning.

Potential Impact on Agricultural Lands, Wetlands and Floodplains. In accordance with EPA policy concerning protection of agricultural lands, wetlands, and floodplains from growth-related impacts accommodated by wastewater facilities, this section identifies agricultural lands, wetlands, and floodplains in the Coeur d'Alene planning area and evaluates the potential impact of growth on these areas.

Agricultural Lands. Prime agricultural land as designated by the U. S. Soil Conservation Service is found in three areas within the facility planning area (Figure 2-5): the Nettleton Gulch area, the county fairgrounds and adjacent areas, and the area east and west of Ramsey Road north of Highway 10. These areas are located in the unincorporated portion of the county.

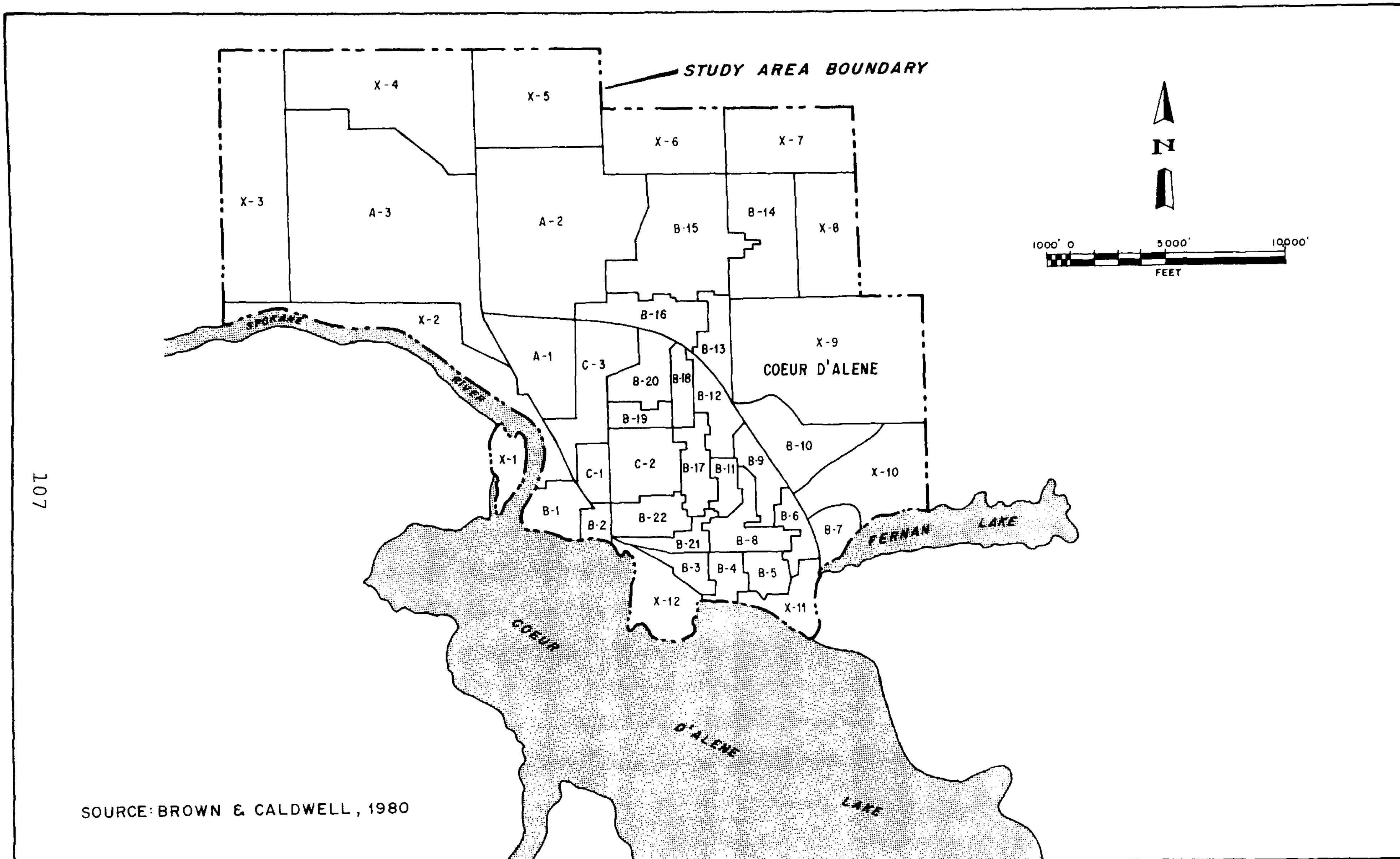

FIGURE 2-4. COEUR D'ALENE SEWER SYSTEM SUB-AREAS

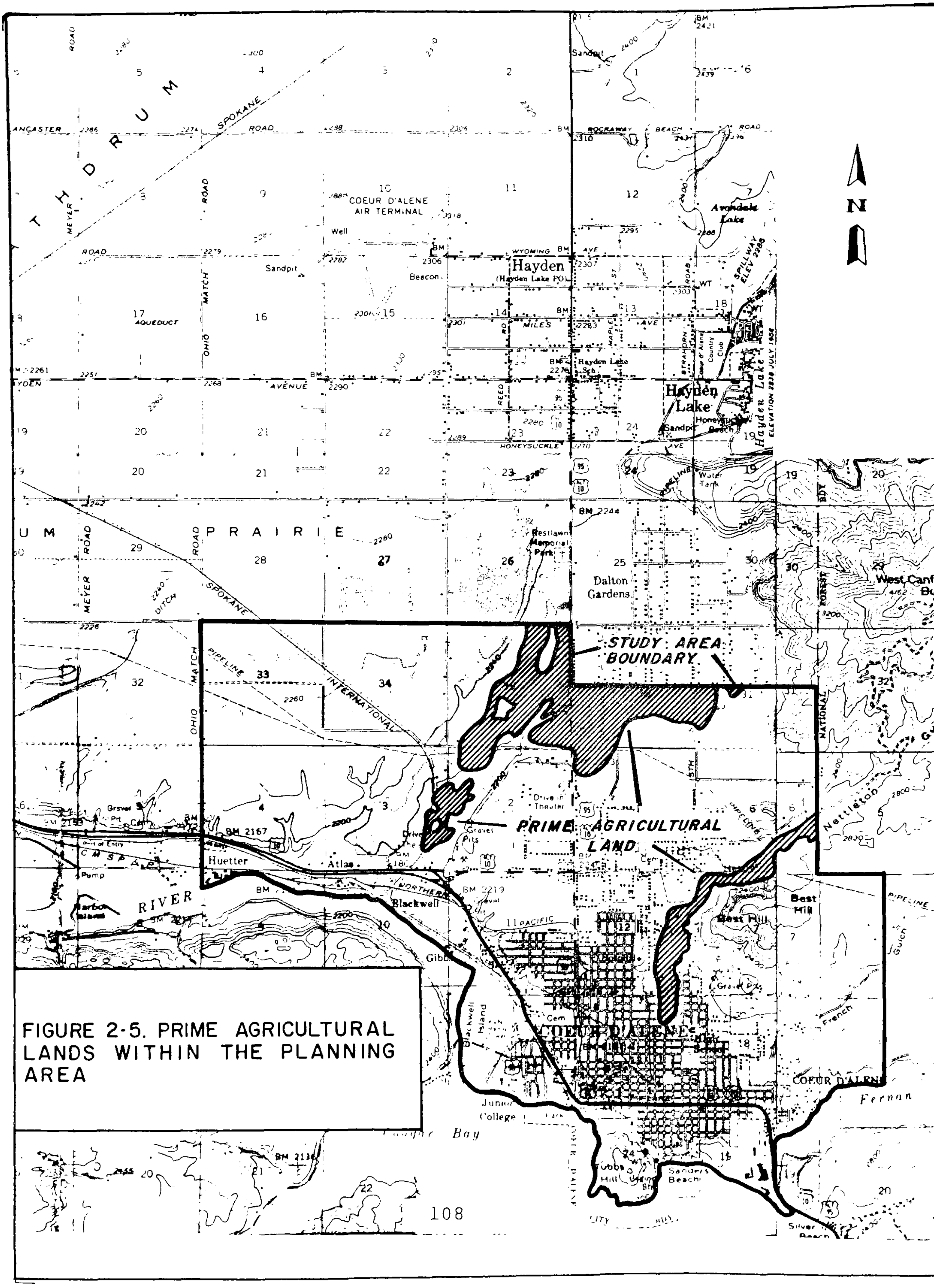

FIGURE 2-5. PRIME AGRICULTURAL LANDS WITHIN THE PLANNING AREA

Most of the prime agricultural land presently is under production. Grass seed and alfalfa are the main crops. Scattered residences, however, are found throughout most of these areas. In addition, the county fairgrounds and the high school are located in prime agricultural areas.

Although Kootenai County has policies that support protection of agricultural lands in current production, the county land use map designates these prime agricultural areas for eventual urban use. In the city comprehensive plan, the Nettleton Gulch and county fairgrounds areas are designated high density residential. The Ramsey Road prime agricultural area is designated commercial/industrial.

Continued agricultural use in these prime agricultural areas is jeopardized by anticipated growth accommodated by wastewater facilities expansion. At present, local policies to protect agricultural resources are ineffective. Since much of this prime agricultural land is located away from projected near-term growth areas, mitigation measures could be effective. In addition to stronger local restrictions on agricultural land development, other mitigation measures include: 1) preferential property tax assessments, 2) purchase of development rights, 3) agricultural districting, 4) transfer of development rights, 5) stricter state control of prime agricultural land development, and 6) 201 grant conditions requiring prime agricultural land protection. There are many more potential mitigation measures. The City of Coeur d'Alene should conduct an environmental assessment of prime agricultural land losses prior to constructing new wastewater interceptors into the prime farmland areas.

Floodplains. Within the facility planning area, two potential flood hazard areas can be found. They are the Spokane River area and the Nettleton Gulch area. The area adjacent to the Spokane River begins where the river leaves Lake Coeur d'Alene and borders the river along the southwestern portion of the planning area. It is designated by the National Flood Insurance Program as a 100-year flood hazard area. The area adjacent to Nettleton Gulch, which is an intermittent drainageway, has also been designated as a 100-year flood hazard area.

In general, development in the floodplain adjacent to these waterways is discouraged in the Kootenai County Comprehensive Plan by a requirement for special building permits as part of the National Flood Insurance Program. In addition, on-site sewer restrictions in floodplain "fringe areas" have been supported by the PAC in aquifer protection policies.

Urban development planned for Blackwell Island in the Spokane River is within the 100-year flood hazard zone and is expected to be served by the new wastewater facilities. In addition, growth is projected in the general vicinity of Nettleton Gulch. To the extent that existing regulations are effective, the potential for adverse impacts will be reduced. Buildings in these areas must be constructed so as to avoid serious damage or health hazards during the 100-year flood.

Wetlands. Coeur d'Alene's facilities plans call for eventual connection of Blackwell Island to the city sewer system. This is included because of plans to construct a hotel, condominiums, specialty shops, office space and restaurants on undeveloped portions of the island. Blackwell Island is located within the Spokane River floodplain where the river flows out of Lake Coeur d'Alene. It is a lowlying area and portions of it were filled in the past. The proposed developer states that there are 15 acres of wetlands on the island. Wetland boundaries were surveyed by the local engineering firm of LePard and Frame (Brown, pers. comm.). Cursory field reconnaissance of the island verified the presence of wetlands, but neither the U. S. Fish and Wildlife Service nor the Idaho Department of Fish and Game have officially mapped the island's wetlands.

EPA regulations implementing Section 201 of the Clean Water Act state that federal grants for new sewer collection systems cannot be made unless the Regional Administrator finds that the system "would not provide capacity for new habitations or other establishments to be located on environmentally sensitive land such as wetlands, floodplains or prime agricultural lands. Appropriate and effective grant conditions, (e.g., restricted sewer hookup) should be used where necessary to protect these resources from new development" (40 CFR 35.925-14). Federal grants are not expected to be used for collection system construction. EPA regulations implementing NEPA, however, also contain strong language regarding protection of wetland and floodplains. The introductory policy statement of the Procedures on Floodplains Management and Wetlands is as follows: "the Agency shall avoid wherever possible the long- and short-term impacts associated with the destruction of wetlands and the occupancy and modification of floodplains and wetlands, and avoid direct and indirect support of floodplains and wetland development wherever there is a practicable alternative" (40 CFR 6, Appendix A). While EPA will not participate in financing the interceptor connection to Blackwell Island, the agency is considering award of funds that would provide the wastewater treatment capacity for development of Blackwell Island.

Island development plans have not been reviewed, but the developer has stated that wetlands will not be filled and no building foundations or structures will be placed on wetlands. He also indicated that the flood hazard will be avoided by raising the level of the island above the 100-year floodplain in those areas with structures for human habitation (Brown, pers. comm.). EPA has not conducted its own wetlands assessment of Blackwell Island because the development plans have not been available. Therefore, EPA intends to place a condition on its wastewater facilities grant award to the city. Before receiving a Step 2 grant award for facilities design, the city must assure EPA that no wetlands or 100-year floodplains will be developed in violation of federal protection policies as a result of expanding the city's wastewater treatment capacity. This should be accomplished by conducting an environmental assessment of the Blackwell Island development. The U. S. Army Corps of Engineers, the U. S. Fish and Wildlife Service, the Idaho Department of Fish and Game, and EPA should be consulted in this assessment.

Conclusion. Extension of the existing sewer system will accommodate anticipated growth in the Coeur d'Alene facility planning area. The distribution of future populations as projected in the facilities plan should roughly correspond to the land use pattern presented in the Coeur d'Alene comprehensive plan. The extent of projected growth, however, approaches the buildout capacity of the facility planning area by the year 2005. Based on local land use plans and policies, the level of growth projected in the facilities plan exceeds local expectations.

Implications of Growth on Key Public Services

Continued rapid growth in the Coeur d'Alene area will result in increasing demands on the public service system. Revenues generated by additional economic activity will offset to a certain extent the costs of providing these services. Implementation of fiscal constraints, however, will limit the ability of local public service agencies to finance historic levels of service.

The following sections examine the present capabilities of key public services emphasizing the impact of the 1 percent law. In addition, the potential impact of near-term growth on public services is assessed.

The Present Condition of Public Services.

Schools. The Coeur d'Alene planning area is within Coeur d'Alene School District 271. Other communities within District 271 include Dalton Gardens, Hayden, and Hayden Lake. The District 271 facilities consist of nine elementary schools, one special education school, two junior high schools, and one senior high school. These schools are located within the Coeur d'Alene planning area, except for two elementary schools located in Hayden Lake. Enrollment in 1978-1979 was 7,029 students, up from 6,477 in 1977-1978 and 6,268 in 1976-1977 (Coeur d'Alene School District 271, pers. comm.). According to the Superintendent of District 271, overcrowding currently is a problem in some schools, especially at the secondary level (Steim, pers. comm.).

NIC, a community college located in Coeur d'Alene, had an enrollment of 1,750 day students in 1979-1980. The college is expecting a 5 percent annual increase in enrollment through the 1986-1987 academic year. In addition to daytime enrollment, the college accommodates 800-1,000 students in noncredit evening courses. This figure is expected to double in the next 5-7 years (NIC, pers. comm.).

The impact of the 1 percent law has been primarily to curtail program expansion. Although no layoffs have occurred, some personnel have been lost through attrition. Future needs, in order of priority, include: a second high school, expansion of the northern junior high school, and a new elementary school in the northern portion of the district (Steim, pers. comm.).

Police. Police protection in the study area is provided by the Coeur d'Alene Police Department and the Kootenai County Sheriffs. Due to the passage of the 1 percent law, the city department lost two positions. The 1980-1981 budget, however, recently adopted by the city council, restored these positions and added five new patrol cars. Major adverse impacts of the 1 percent law include postponed implementation of new prevention programs and delayed attempts to shorten patrolmen's response time.

Fire. Fire protection in the study area is provided by the city fire department and Kootenai County Fire Protection District No. 1. The city fire department maintains a primary station and a substation. Fire protection in the City of Coeur d'Alene is considered very good based on their fire insurance rating (Coeur d'Alene Fire Department, pers. comm.).

Although the city fire department has not lost any manpower as a result of the 1 percent initiative, implementation of most fire prevention programs has been postponed. Upkeep of trucks and equipment is considered a top priority.

Water Supply. Coeur d'Alene operates its own municipal water system. This system depends on groundwater for its main supply and uses lake water for meeting peak (summer) demands. The system includes five wells and six lake pumps and is capable of producing 30 MGD, well above normal daily requirements (about 16 MGD). Water storage capacity for the city is considered inadequate and in need of expansion. In addition, there are 36 miles of wooden pipes in the system which need replacement. Overall, the capacity of the system is somewhat ahead of design plans based on anticipated need (Coeur d'Alene Department of Public Works, pers. comm.).

Transportation. Two major highways transect the planning area. Interstate 90, running east-west, connects the planning area with Spokane on the west and Missoula on the east. U. S. Route 95, running north-south, connects the planning area with Canada on the north and southwestern Idaho on the south. Bus and rail lines also serve the area.

Air service to the planning area is provided by the 800-acre Coeur d'Alene air terminal, located 5 miles northwest of the city. Although the airport currently serves only small planes, future expansion plans would accommodate larger commercial planes.

Within the planning area, Coeur d'Alene operates its own street department which is responsible for city street maintenance, and Kootenai County services a highway district. Both the street department and highway district have considerable need for new equipment and facilities. Circulation in the downtown area is an additional problem which will be compounded by anticipated growth.

Recreation. Within the planning area, many recreational opportunities are available to both visitors and residents. Coeur d'Alene Lake (with numerous campgrounds and picnic areas) provides the major focus for recreational activities. In the City of Coeur d'Alene, the amount of park area presently exceeds national standards established by the National Recreation Park Association (Halpern, pers. comm.).

The 1 percent law has resulted in a 25 percent decrease in the city Recreation and Parks Department budget since 1978. Three full-time positions have been eliminated. Most impact from personnel cutbacks has been on maintenance programs. This problem has been aggravated by declining personnel quality due to hourly wage reduction of CETA employees.

Solid Waste. Solid waste is collected by private firms under contract to the City of Coeur d'Alene and the county. A sanitary landfill outside of Coeur d'Alene separates the wastes and then compacts and buries putrescible garbage. The life of the landfill is estimated to be 5-7 years if the baling process is continued. As yet, no future site has been secured although a site adjacent to the present landfill is under consideration. Potential threats to the aquifer eliminates many sites from consideration.

Summary of Capabilities of Public Service System and Potential Impact of Near-Term Growth. Most public service agencies in the City of Coeur d'Alene and adjacent areas of Kootenai County are experiencing difficulties in meeting the service requirements of existing populations. Rapid population growth during the 1970s is likely the major cause of these service shortfalls. In addition, recent fiscal constraints, coupled with high inflation, have further hindered the delivery of historic levels of service.

Additional near-term growth will likely aggravate present deficiencies unless growth occurs in an area already served by an existing system. From 1980-1985 approximately 4,400 additional persons are projected to locate within the facility planning area. With most public services already in a "catch up" position as a result of past rapid growth, this new influx of population will present additional demands, which will compound existing deficiencies. Public services most likely to be impacted are service-oriented, such as police and fire protection. The projected distribution of new growth could severely tax the ability of these agencies to maintain existing levels of public safety. Schools could be severely impacted also if incoming residents consist of high number of children, especially at the secondary level. The longer-term growth impacts will impinge on public services which need costly investments for infrastructure expansion. This includes primarily water supply and transportation improvements.

In conclusion, the impact of projected growth on public service systems will depend on the ability of local jurisdictions to finance expansion of service and needed capital improvements. The following section reviews existing fiscal capabilities to meet additional growth demands.

Fiscal Implications of Growth

Fiscal Overview. Rapid growth is expected to continue in the Coeur d'Alene area. This growth will require significant private and public expenditures. In this section, the ability of local public service agencies to pay the future costs of growth is evaluated.

Public Services and Revenue Sources.

Service Provisions. Within the facility planning area, public services are provided in some cases by the City of Coeur d'Alene and Kootenai County and in other cases by special purpose districts. In the City of Coeur d'Alene, virtually all public services are provided by the city, except for public education, which is provided by the school districts. Throughout the county, most services are provided by special districts.

This variation suggests the difficulties in generalizing about either service provision or cost/revenue issues. Depending on the location of a residence or business, a different package of services from a different set of service providers can result. With many different public agencies involved, each assuming independent service responsibilities and taxing authority, analysis of the public service outlook is difficult.

Revenue Sources. Property taxes have long been the main source of local government finance in Idaho. Historically, property taxes have been used to balance the budget. This dependence has been declining throughout the 1970s, and the 1 percent initiative seems likely to further reduce local agencies' reliance on property tax.

Other taxes may be imposed at local option if authorized by the state legislature. The sales tax, which is a major source of revenues in some states, provides only a small contribution to local tax coffers, although a local sales tax could be added to the state's 3 percent rate with state approval. Additional revenue sources include federal and state grants and revenue sharing, fees, fines, reimbursements for services, licenses and permits, interest, rents, and other miscellaneous sources. Bonding, which is commonly used throughout the nation to finance capital facilities, has not been used extensively in Idaho due to a tradition of pay-as-you-go financing.

Fiscal Outlook. The fiscal outlook for the City of Coeur d'Alene and Kootenai County is similar: a decline in the short-term in revenues and consequently a need to alter the revenue structure and/or the level of service delivered.

Declining Revenues. The impact of the 1 percent law on the City of Coeur d'Alene has been to freeze property tax revenues at their 1978 levels. (The major effect of this freeze has been on the general fund revenues.) Property taxes, however, are not the only revenues that have declined. With the recent downturn in economic activity, development-related fees have also been reduced. As a result of revenue decreases, competition for state and federal assistance has increased.

Public services most dependent on property tax revenues are likely to experience the most severe revenue problems. These impacts will depend to a significant degree on the implementation of the 1 percent law by the state legislature. Public education historically has relied on property taxes to offset differences between other revenue sources and costs. To partially offset the current fiscal plight, a portion of the state sales tax has been earmarked for public education. In addition to schools, police services and transportation services impose major revenue requirements on property taxes.

Fiscal Response. As a result of the 1 percent law, Coeur d'Alene's budget was frozen during the 1978-1979 and 1979-1980 fiscal years. Coupled with the impact of inflation, the frozen budget has impeded expected fiscal growth. However, the 1980-1981 budget, recently adopted by the city council, represents a 26 percent increase over the previous year. A number of factors contributed to the budget increase. They include: a large beginning balance from the previous year, accurately estimating revenues and expenditures, and major increases in the special funds portion of the budget. Increases in service charges for water and sewer and the availability of grant money for wastewater treatment plant facilities account for the increases in special funds.

Unless the 1 percent property tax initiative is overridden in the state legislature, property tax will provide a decreasing proportion of local government revenues. Other sources of revenues, such as general obligation bonds, local option taxes and state payments in lieu of taxes, are commonly suggested as alternative sources to property taxes. In addition, increased user charges and growth management fees have been suggested as a means to finance future residential development.

In some cases, a number of services can be (and frequently are) performed by private entities rather than by public agencies. These include solid waste disposal (where an individual hauls his own or contracts a private firm to provide the service) and water (on-site wells or private services). If the costs of providing a public service system thus appear prohibitive, the responsibility could in some cases be passed on to the developer or individual householder.

The benefits of comprehensive land use planning are often associated with a reduction in public service costs. Implementation of land use policies can minimize costly extensions of public service networks. Some approaches include: tie new development to existing infrastructure, require infill and contiguous development, approach annexation cautiously, and emphasize development phasing.

Conclusions. A reassessment of growth and planning policies is occurring in Coeur d'Alene. The recent economic slowdown has provided some breathing time to adjust growth policies to new and expected fiscal constraints. Future growth will likely need to be concentrated in or adjacent to urban areas where efficiency in urban service delivery can be achieved. If the quality of municipal services deteriorates considerably, the long-term implications to economic development could become significant. To offset anticipated reductions in property tax revenues, other sources of revenues will increasingly need to be explored.

Electricity and Gas

Continued rapid growth in the Coeur d'Alene area will result in increased consumption of electricity and gas. According to Washington Water Power Company (WWP), the principal supplier of electricity and natural gas in the area, electrical supplies have been critically short in the past, and the outlook for improvement in the near future is not bright. Demand has been increasing by about 5 percent per year, but generation capacity is not increasing (Witter, pers. comm.). Gas supplies from Canada are adequate, but electrical generation has remained fixed in recent years because new projects have been slow to receive approval. Most electric generation comes from hydroelectric plants; therefore, in drought years there has been a serious reduction in generation capacity. As a result, WWP has been encouraging use of gas as the major energy source for new development in the Coeur d'Alene-Post Falls area (Pierce, pers. comm.). Continued rapid growth in the Coeur d'Alene area will place an additional strain on WWP supplies.

Potential impacts on energy supplies can be controlled to a degree by initiating simple conservation-oriented planning policies on a local scale. This could include incorporating energy conservation requirements into building codes, publicizing household-oriented energy and resource conservation techniques in schools and through the local media, and conducting local energy education campaigns. Energy fairs and workshops have been valuable in disseminating conservation information that can both reduce demand and save consumer dollars on utility bills.

Air Quality

Current Air Quality Conditions. Air quality in the Coeur d'Alene area is quite good most of the year. Favorable wind patterns and the relatively low population density of the area combine to create this condition. The only readily apparent air quality problem occurs in late summer when the grass fields on the Rathdrum Prairie are burned after harvest. During this 4-6 week burning period, dense smoke can envelope the urban areas on the edge of the prairie. This includes Coeur d'Alene.

Because there have been few indications of serious air quality problems in the area, the State of Idaho has not established a broad air quality monitoring program. Currently, one monitoring station is operating in downtown Coeur d'Alene. It monitors only total suspended particulates (TSP). A second TSP station has operated at the airport near Hayden, but it is presently closed.

The 1970-1979 TSP monitoring results for the Coeur d'Alene and Hayden stations are presented in Table 2-19. The primary National Ambient Air Quality Standard (NAAQS), in terms of annual geometric mean, has been exceeded only once, in the area. That was in 1976 in Coeur d'Alene. The 24-hour standard has been exceeded 10 times in the 1970-1979 period (IDHW Air Quality Bureau, 1979). Violations of the 24-hour standard have historically been attributed to agricultural burning. There are numerous other sources of particulates in the Coeur d'Alene area. Wood-waste burners at area lumber mills, sand and gravel mining operations, construction and demolition operations, woodburning stoves and fireplaces, and street dust are all contributors to local particulate levels. A source inventory that quantifies these contributions has not been developed.

Motor vehicle-related pollutants (carbon monoxide, nitrogen dioxide, hydrocarbons, lead) have not been monitored near Coeur d'Alene because it is felt that a vehicle-related air quality problem does not exist. Currently, Kootenai County is classified as an attainment area for all air pollutants under the federal Clean Air Act (Pfander, pers. comm.).

Transportation Planning. To date there has been no comprehensive transportation planning in the Coeur d'Alene area. Therefore, there has been no transportation modeling that would give an estimate of daily vehicle miles traveled (VMTs) in and around Coeur d'Alene. The State of Idaho Department of Transportation, District 5, plans for physical roadway improvements, but they are concerned only with Interstate 90 and U. S. Highway 95. Traffic volume counts are recorded and highway improvements are made when funds are available, but VMT estimates that could be used for air quality analyses are not developed (Ross, pers. comm.).

The City of Coeur d'Alene maintains its own street system, but is just now beginning to develop a transportation plan to deal with long-term traffic needs. The city is currently planning a number of intersection improvements and road widenings, but must receive federal aid funds to implement its plans. Traffic statistics and projections are not maintained (Markley, pers. comm.).

Table 2-19. Summary of Total Suspended Particulate Measurements in the Coeur d'Alene Area, 1970-1979 ($\mu g/m^3$)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Annual Geometric Mean[1]										
Coeur d'Alene	63	65	65	71	71	54	77		58	63
Hayden								52	44	45
Maximum Value[2]										
Coeur d'Alene	382	292	254	270	393	272	190	201	159	174
Hayden								503	370	137

[1]National ambient air quality primary standard is 75 $\mu g/m^3$, secondary standard is 60 $\mu g/m^3$.

[2]National ambient air quality primary standard is 260 $\mu g/m^3$, secondary standard is 150 $\mu g/m^3$

SOURCE: IDHW Air Quality Bureau, 1979.

Influence of Alternative Wastewater Projects. If no wastewater facilities improvements are made in Coeur d'Alene (the "no-action" alternative), the city's anticipated population growth will not occur. IDHW restrictions on new sewer extensions and PHD restrictions on septic tank use over the Rathdrum Prairie aquifer would combine to limit Coeur d'Alene's growth. Under these conditions it is unlikely that vehicle traffic would increase sufficiently to cause violation in the NAAQS. This conclusion is speculative because current levels of auto-related pollutants are unknown. There is presently no evidence, however, that an air pollution problem exists in the area, and the small population increases in the area that are likely under the "no action" option should not change this situation.

Population in the planning area is expected to increase from the present 25,500 to 58,000 in 2005 under the three action alternatives. The new wastewater facilities would accommodate this level of growth. It is impossible to predict whether air quality will be degraded to the point of NAAQS violations by this growth, because current conditions are unknown. The federal vehicle emission control program should offset some of the air pollutant emissions resulting from the population increase, but whether the total increase would be offset is unknown. There are insufficient data on existing and future vehicle travel to make a prediction. Particulate levels will increase with increases in construction activity, traffic, home woodburning, sand and gravel mining and development-related soil erosion.

Mitigation. As the population of the Coeur d'Alene urban area increases, positive steps should be taken to anticipate and restrict a gradual deterioration in air quality. Monitoring of vehicle-related air pollutants in the downtown area should be initiated at some point so that the existing air quality situation can be determined. The City of Coeur d'Alene's transportation planning efforts should be encouraged. This planning should eventually lead to estimations of daily vehicle traffic in the area and predictions of future vehicle traffic. With this information, it will be possible to predict whether or not growth in the Coeur d'Alene area could eventually produce violations of national air quality standards. If a potential problem is identified, additional mitigative steps can be taken.

Particulate problems in the Coeur d'Alene area are now being controlled at least in part by regulation of grass burning by the IDHW. The IDHW is using meteorologic data from the prairie to more accurately assess weather conditions and therefore restrict burning to periods when smoke can be rapidly dispersed and particulate fallout in urban areas can be minimized. Additional control strategies could include stricter regulation of sand and gravel mining and lumber milling operations, thorough street cleaning and tighter controls on dust production at construction sites.

Water Quality

The conversion of land to industrial, commercial and residential uses can increase water quality problems as well as problems with water supply. The two most obvious concerns are increased urban runoff and soil erosion. As agricultural or undeveloped land is covered by buildings and pavement, the amount of precipitation that runs off as overland flow increases. Oil and grease and the wide variety of chemicals that are used around dwellings are carried in greater quantites into storm drains and surface waters. Where soils have been disturbed during construction, the heavier runoff carries soil and silt with it; this affects both the quality of surface waters and their value as wildlife habitat. Most urban runoff enters storm drains or natural drainageways; it therefore passes untreated into the surface and groundwaters.

Control of urban runoff and erosion has received little attention in the past, mainly because neither has contributed to the wastewater treatment problems of local agencies. Section 208 of the federal Clean Water Act provides the impetus and means for development of plans to control these nonpoint sources of pollution. The 208 planning in the Coeur d'Alene area would therefore be the normal vehicle for this nonpoint pollution control planning. However, the pressing concern for wastewater contamination of the Rathdrum Prairie aquifer has been the first priority, and most of the 208 effort has dealt with on-site wastewater disposal and its effects on the aquifer.

Policy 14 of the 208 water quality management plan does address nonpoint sources of pollution. It states: "New development should be planned, designed, constructed and maintained to involve the minimum feasible amounts of impervious cover as a means of enhancing the retention of open space for aquifer recharge while minimizing the impact of harmful constituents contained in urban stormwater runoff on the aquifer. Oil skimming basins will be required in areas that oil waste products are anticipated. Dry wells should be prohibited at gas stations" (PAC, 1978).

This 208 policy along with local land use planning policies can act as the basis for nonpoint pollution control action by local and state agencies with either direct or indirect water quality management responsibility. This includes the City of Coeur d'Alene, Kootenai County, the PHD and the IDHW.

The growth-related land use impacts section of this chapter discusses the land use conversions required to accommodate the populations projected in the wastewater facilities plan. Approximately 2,300 new urban acres will be needed within the 20-year planning period. Percent land coverage has not been estimated, but the facilities plan assumed that new development on the fringes of Coeur d'Alene would include the same number of persons per acre as is currently the case within the city. Increasing urban runoff is a real threat to water quality both in the Spokane River and the Rathdrum Prairie aquifer if some control actions are not taken in the future.

The 208 plan for Spokane County, Washington, which also overlies the Rathdrum Prairie aquifer, deals in some depth with the types and volumes of nonpoint source pollutants that can be generated by urbanization. Table 2-20 presents areal pollutant loading rates selected as representative of the Spokane area. While the Coeur d'Alene urban area is considerably less densely developed than Spokane and has much less industrial development, the pollutant loadings in the table give an indication of the potential for water quality deterioration that can accompany urbanization. The pollutants which are typically contained in urban runoff can become groundwater and surface water contaminants in the Coeur d'Alene area unless control measures are adopted. Urban runoff presently goes untreated, the majority percolating through the coarse soils of the area and into the groundwater.

Control and mitigation of growth-related nonpoint source pollutants can be achieved in a variety of ways. The responsibility for identification and implementation of control measures lies with local and state government through ongoing 208 water quality management planning. Continued planning in this regard is encouraged by EPA.

Cultural Resources

As stated in the floodplains and wetlands discussion, the Coeur d'Alene treatment plant expansion would include capacity for wastewater flows from Blackwell Island. The plans for development of Blackwell Island have not been reviewed, but it is possible that construction activity on the island could disturb cultural resources. Past archeological excavations have found cultural deposits on the island to a depth of 39 inches (for details see Appendix A). The treatment plant would also provide wastewater service for commercial and residential development of vacant land bordering the existing city treatment plant. Archeological Site 10-KA-48, which appears to be eligible for inclusion on the National Register of Historic Places, may extend over this area.

Table 2-20. Areal Runoff Loading Rates Selected for Spokane (lbs/acre/year)

	Percent of Developed Area	Total Suspended Solids	Total Dissolved Solids	BOD_5	COD	Total Nitrogen	Nitrate-Nitrogen	Total Phosphorus	Ortho-Phosphate	Chloride	Sulfate	Sodium
Open Space		75	10	5	25	1.5	0.4		0.3	0.3		
Residential	56	400	120	50	200	4.8	1.3	4.1	1.7	4.2		
Commercial	34	600	200	70	300	3.5	1.6	2.1	1.0	2.1		
Light Industrial	2	800	200	70	400	3.4	0.8	ND	2.0	2.1		
Heavy Industrial	8	400	100	40	300	1.8	0.6	ND	1.3	1.4		
Weighted Ave[2]		545	150	57	246	4.0	1.3	3.3	1.5	3.2	25	3.0
WRS[3]		500		50	240	4.5	0.6		1.0			

	Cadmium	Chromium	Copper	Lead	Nickel	Zinc	Mercury	Pesticides	Poly Chlorinated Biphenyl[1]	Oil & Grease	Total Coliform[1]	Fecal Coliform[1]	Complex Organics
Open Space	$5x10^{-5}$	$4x10^{-4}$		$1x10^{-3}$		$2x10^{-3}$					$6x10^{9}$	$3x10^{8}$	
Residential	0.006	0.4	0.19	2.9	0.06	0.7					$1.6x10^{12}$	$1.5x10^{11}$	
Commercial	0.002	0.2	0.06	1.5	0.02	0.2					$3.6x10^{11}$	$3.7x10^{10}$	
Light Industrial	0.01	0.42	0.20	0.5	0.06	0.6					$1.5x10^{12}$	$1.1x10^{11}$	
Heavy Industrial	0.004	0.3	0.11	1.2	0.04	0.3					$3.9x10^{11}$	$8.6x10^{10}$	
Weighted Ave[2]	0.0046	0.40	0.14	2.2	0.04	0.5	0.1	0.4	0.01	12	$1.1x10^{12}$	$1.1x10^{11}$	0.
WRS[3]				0.5		0.6							

[1] Number/acre/year.
[2] Values for Residential, Commercial, Light Industrial and Heavy Industrial weighted by percent of total developed.
[3] Reference 9.

SOURCE: Spokane County, Office of County Engineers, pers. comm.

Before EPA awards a Step 2 construction grant for wastewater facilities design, the City of Coeur d'Alene must provide assurance that archeological resource assessments will precede development of these properties. These assessments should be conducted in cooperation with the Idaho State Historic Preservation Officer and EPA, Region 10 in Seattle, Washington.

CHAPTER 3

COORDINATION

Chapter 3

COORDINATION

Introduction

Section 6.203 of the EPA procedures for implementation of the National Environmental Policy Act (Federal Register, Vol. 44, No. 216, November 6, 1979) requires that all EISs discuss the extent and results of coordination activities conducted prior to publication of EISs. This chapter describes the involvement of government agencies, special interest groups and the public in determining the scope and content of this EIS. It also describes how, when, and where coordination efforts will continue.

Coordination Efforts to Date

EPA efforts to determine the interests of government and public groups regarding Coeur d'Alene wastewater facilities planning were started with a project scoping meeting held in Coeur d'Alene, Idaho on June 4, 1979. The original intent of EPA was to consider both the Post Falls and Coeur d'Alene projects in a single EIS, so the scoping meeting dealt with both communities. The meeting notice was sent to 12 individuals and agencies and 19 persons attended. The discussion centered around several key issues: 1) schedule for completion of both facilities plans, 2) alternatives being considered in the Post Falls project, 3) relationship of Hayden and Hayden Lake facilities planning to the Post Falls and Coeur d'Alene work, 4) water quality and algal assay work on the Spokane River, 5) public participation in the Post Falls and Coeur d'Alene projects, 6) need for development and consideration of joint wastewater schemes involving Post Falls and Coeur d'Alene, 7) need for a population projections' review by the Idaho Department of Health and Welfare, and 8) scope of the EIS air quality analysis.

As a result of this meeting, it was decided that: 1) the Post Falls alternatives could be completely described by the end of June 1979, 2) Post Falls was considering three basic project alternatives, 3) Hayden and Hayden Lake planning efforts would be considered in a separate environmental analysis, 4) the Post Falls and Coeur d'Alene EIS public participation would be combined, 5) the facilities plan engineering firms for Post Falls and Coeur d'Alene would combine efforts to investigate the feasibility of joint wastewater alternatives, and 6) air quality did not appear to be a major environmental issue in the Coeur d'Alene-Post Falls area.

On June 27, 1979, official notice of EPA's intent to prepare an EIS on the Coeur d'Alene and Post Falls projects was published in the Federal Register. This notice was issued to state and local government agencies and public interest groups.

Since the scoping meeting EPA has contacted a variety of individuals and agencies to collect background data and define project-related environmental issues. Contacts have been made in person, by phone, and through correspondence. A mailing list of individuals and agencies contacted in preparing this Draft EIS is included in Appendix C. In addition, EPA has actively participated in the facilities plan public participation effort. Monthly meetings of the facilities plan citizens advisory committee have been attended by EPA representatives and have been used as a forum for discussing projected-related environmental issues. Advisory committee meetings began in November 1979 and have continued to the present. At several meetings EPA made formal presentations on issues identified, the status of EIS preparation, and agency policy regarding wastewater disposal methods. All advisory committee meetings have been advertised locally and were open to the general public.

On September 30, 1980, EPA sponsored a public meeting to discuss the final three wastewater alternatives being considered by Coeur d'Alene. The alternatives were described and a preliminary list of impacts was presented. Approximately 20 people attended the meeting and a number of questions and concerns were voiced. Topics that received the most attention were: 1) the relative timing of issuing the Draft EIS and the selection of a preferred alternative by the citizens advisory committee, 2) the rate of population growth being used for planning purposes, 3) wastewater treatment and water quality requirements that might be imposed by the IDHW or EPA, 4) funding methods and timing for interceptor construction, 5) source of aquifer water quality data, 6) joint wastewater solutions for Coeur d'Alene and Hayden, and 7) the viability of irrigation disposal over the Rathdrum Prairie aquifer. Each of these topics had been raised at some point earlier in the facilities planning process and therefore did not stimulate a change in the scope of the Draft EIS.

Suggestions and Objections Received Through Coordination

EPA has received several suggestions and objections through its coordination efforts that have influenced the content of this Draft EIS. The most important are summarized below.

Alternatives Coverage

Early in the Coeur d'Alene facilities planning process, representatives of the Panhandle Area Council (PAC) and the Panhandle Health District (PHD) requested that regional solutions to Kootenai County's wastewater disposal problems be investigated. The communities of Post Falls, Coeur d'Alene, Hayden and Hayden Lake all needed to improve wastewater treatment methods. The close proximity of the communities encouraged joint planning. It became apparent, however, that individual cities did not wish to encumber their own projects by planning jointly with adjacent communities. Post Falls and Coeur d'Alene made a brief analysis of a joint wastewater project, but wastewater conveyance costs and potential institutional complexities discouraged serious consideration of that alternative. Although joint projects were discussed at a number of the facilities plan citizens advisory committee meetings and in correspondence between EPA and the cities, all joint or regional alternatives eventually were eliminated from Coeur d'Alene's project planning. Joint or regional alternatives, therefore, have been eliminated from this environmental analysis. Chapter 9 of the draft wastewater facilities plan (Brown and Caldwell, 1980) contains a detailed description of the alternatives considered and dropped during the early stages of facilities planning.

Issues Coverage

The discussion of environmental issues presented in this Draft EIS has been shaped to a large degree by consulting with numerous government agencies and individuals. The scope and content of the surface and groundwater quality impact sections were discussed on numerous occasions with staff of the Idaho Department of Health and Welfare, Division of Environment, the Washington Department of Ecology, the Panhandle Health District, the Idaho Department of Fish and Game, the City of Coeur d'Alene and the City of Post Falls. While specific changes in EIS content cannot be attributed to any individual coordination effort, each discussion had some influence on the content of the water quality analyses. The discussions of growth and land use compatibility were strongly influenced by coordination with the City of Coeur d'Alene, the Kootenai County Planning Department, the Panhandle Area Council, and the Idaho Department of Health and Welfare. Additional instances where coordination has shaped the content of this EIS are summarized below.

The U. S. Fish and Wildlife Service area office in Boise, Idaho was contacted to determine if any wildlife or plant species on the federal threatened or endangered lists were known to occur in the Coeur d'Alene facilities planning area.

The Fish and Wildlife Service replied that only the endangered bald eagle was known to occur in the area (Gore, pers. comm.). As a result of this exchange, the biological impacts discussion in the EIS was narrowed.

Facilities plan Alternative B, which would expand wastewater facilities at the existing Coeur d'Alene treatment plant site, has generated considerable interest by adjacent landowners. At the May 1980 facilities plan advisory committee meeting, Dr. Barry Schuler, president of North Idaho College, stated that the college is opposed to further expansion of wastewater facilities at the present plant site. The existing plant creates occasional odor problems on the college campus to the south and the school would, in the future, like to expand northward toward the plant. Adjacent landowners, Heutly and Hebner, attended the same meeting. They indicated that plant expansion might impact plans for developing property north and east of the plant. As a result of these discussions, the land use compatibility section of the Draft EIS was expanded.

Continuing Coordination Efforts

This Draft EIS has been forwarded to numerous federal, state, and local agencies, special interest groups, and private citizens. It is an informational document for review and comment on the proposed wastewater project. The distribution list is included as Appendix C. The document has been forwarded to public libraries in the Coeur d'Alene area to enable concerned residents to review potential impacts of the project.

Individuals or groups that wish to comment on the EIS may forward written comments to:

Ms. Norma Young, M/S 443
U. S. Environmental Protection Agency, Region 10
1200 Sixth Avenue
Seattle, Washington 98101

EPA will conduct a public hearing to solicit oral comments on the Draft EIS and the wastewater facilities plan at:

Coeur d'Alene City Council Chambers
City Hall
Coeur d'Alene, Idaho
7:30 p.m., February 18, 1981

All oral and written comments received on the Draft EIS will be recorded and responded to in a Final EIS which will be available to interested individuals, groups, and agencies approximately 2 months after the public hearing.

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ACRONYMS AND ABBREVIATIONS

CWA - Clean Water Act

BOD_5 - 5-day biochemical oxygen demand

DO - dissolved oxygen

EIS - Environmental Impact Statement

EPA - U. S. Environmental Protection Agency

FIA - U. S. Federal Insurance Administration

HUD - U. S. Department of Housing and Urban Development

IDHW - Idaho Department of Health and Welfare

IDWR - Idaho Department of Water Resources

MCL - maximum contamination level

mg/l - milligrams per liter

mmhos/cm - millimhos per centimeter

M-O - May to October

MPN - most probable number

N - nitrogen

N-A - November to April

NAAQS - National Ambient Air Quality Standards

NEPA - National Environmental Policy Act

NO_3 - nitrate

NO_3-N - nitrate measured as N

NPDES - National Pollutant Discharge Elimination System

NIPDWR - National Interim Primary Drinking Water Regulations

P - phosphorus

PAC - Panhandle Area Council

PHD - Panhandle Health District I

ppb - parts per billion

Q_{7-10} - lowest 7-day average flow condition reported over 10 years of record

RCRA - Resource Conservation and Recovery Act

SDWA - Safe Drinking Water Act

SMP - sewer management plan

SS - suspended solids

TLM - tolerance limit median

TSP - total suspended particulates

USGS - U. S. Geological Survey

USSCS - U. S. Soil Conservation Service

WWP - Washington Water Power Company

WWTP - wastewater treatment plant

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APPENDICES

Appendix A

HISTORIC AND ARCHEOLOGICAL RESOURCES REPORT, UNIVERSITY OF IDAHO LABORATORY OF ANTHROPOLOGY

University of Idaho
Laboratory of Anthropology
Department of Sociology/Anthropology
Moscow, Idaho 83843

30 October 1980

Dr. Merle Wells
Idaho State Historical Society
610 North Julia Davis Drive
Boise, ID 83702

Dear Merle:

The University of Idaho Laboratory of Anthropology has recently contracted with Jones & Stokes Associates, Inc. of Sacramento, California, to conduct cultural resource investigations of proposed Coeur d'Alene wastewater facilities. This survey has been completed, and the resultant report is enclosed for your review. Jones & Stokes Associates, Inc. request that you forward the results of your review to them at the following address:

2321 P Street
Sacramento, CA 95816

Attn: Charles R. Hazel

Thank you.

Sincerely,

Daniel M. Mattson

cc: Jones & Stokes Associates, Inc.

ARCHAEOLOGICAL SURVEY OF PROPOSED COEUR D'ALENE WASTEWATER FACILITIES

Abstract

On October 23 and 28, 1980, Michael A. Pfeiffer and I conducted a systematic archaeological survey of certain proposed earth-disturbing sites for Coeur d'Alene wastewater facilities. No new cultural properties were recorded, although the proposed actions of Alternatives "B" and "E" will effect a previously recorded archaeological site. It is recommended that these alternatives be aborted, or that the mitigative measures detailed in this report be taken.

Project Locations and Descriptions

The project area consists of three alternative areas for wastewater treatment plants, and a proposed system of interceptor routes (Fig. 1). Treatment site options examined in Alternative "G" consist of three land parcels located north of the city of Coeur d'Alene, in Township 51 North, Range 4 West, Boise Meridian (Fig. 2). The first of these, the Atlas Road site, consists of the W 1/2 of Section 21. The Prairie Avenue site consists of the N 1/2 of Section 28. The third, the Ramsey Road site, is the N 1/2 of Section 34, and the SE 1/4 and S 1/2 NE 1/4 of Section 27. These three areas are level grass fields, currently under cultivation.

A number of interceptor routes proposed along streets in the northern portion of the city, are included in the project (Fig. 3). A third area of proposed activity is located adjacent to the Spokane River, on the western edge of the city Two treatment plant alternative areas are located in this vicinity, along with a interceptor route (Fig. 4). One of these areas, Alternative "E", consists of three site options. Option 1 is located on a partly wooded, partly cultivated area overlooking the Spokane River, in the NE 1/4 of Section 10, T.50 N., R.4 W., B.M. Excepting the cultivated portion of the area, the site appears relatively undisturbed. Option 2 is also located in the NE 1/4 of Section 10. The area is presently the site of an extensive sand and gravel quarry. Almost all of the original sediments have been disturbed or removed. Option 3 is located in a wooded area of fairly undisturbed land, in the N 1/2 N 1/2 NE 1/4 of Section 9, and the S 1/2 S 1/2 SE 1/4 of Section 4, T.50 N., R.4 W., B.M.

Alternative "B", located in the SW 1/4 NE 1/4 of Section 14, T.50 N., R.4 W., B.M., is a plan to expand the present treatment plant to the east and north into a relatively undisturbed wooded area. The proposed interceptor route parallels the river from Option site 3 of Alternative "E", to the existing treatment plant. The exact line of the route has yet to be determined, but would most likely cross areas of fill material and those of undisturbed sediments.

The project is located within the flat valley of the Purcell Trench. The area falls within a ponderosa pine vegetation habitat, and historically supported a dense forest dominated by this species of coniferous tree. Soils consist of thin, sandy loams developed over deep deposits of sands and gravels of glacial- flood origin.

Research and Survey Methodology

A thorough examination of all excessible documents relating to the history and prehistory of the area, was conducted before field investigation was initiated. This consisted of a search of all state and national cultural properties records, all known ethnographic accounts, and various historic records of the area. The author has done previous research concerning the cultural record of the area in question, in association with the Museum of North Idaho in Coeur d'Alene.

Field methodology varied throughout the project. The large, open parcels of land in Alternative "G" were given an on-foot examination, with transect intervals of about 100 feet providing actual coverage of less than 10% of the total surface area. Thick growth of grasses hindered soil visibilty. All proposed interceptor routes in the northern portion of the city were driven. As mentioned previouly, these areas are located along paved streets. Very little actual ground surface is visible. The Alternative "E" and "B" areas adjacent to the river were given about 10% actual coverage, this being most of the exposed ground surface. Vegetation and a thick duff layer limited visibility over most of the areas. All roadbed cuts were examined, revealing coarse sand and gravel material thoughout those areas. Since the interceptor route paralleling the river was not staked or otherwise noted, no exact coverage estimate can be given. The entire eastern shoreline of the river, from Option 3, Alternative "E", to its outlet at the lake, was walked during the course of the survey. Very little original sediments were observed, as almost the entire shoreline of that part of the river has been built up with fill material to provide level platforms for decking logs for the numerous lumber mills in the vicinity.

Cultural Resources

No cultural resources were found during investigations of the Alternative "G" treatment site options north of the city. Likewise, none were recorded along the interceptor routes in the northern portions of the city. However, the most significant archaeological property in the entire area is located in the vicinity of the proposed actions adjacent to the river. This cultural site is situated along the outlet of the river from the lake, and extends for an undetermined distance along the shoreline and adjacent areas of the river (Addendum).

Ethnographic records indicate this site as the largest and traditional head village of the Coeur d'Alene tribe (Teit 1930:38). The extent of the site is difficult to ascertain, as three additional villages or camps were located alongside the first few miles of the river, in the ethnographic memory of the Coeur d'Alenes (Teit 1930:39). This was reported to be the only area in Coeur d'Alene territory where fishing weirs were used on a large scale, and where the most fish were caught and processed (Teit 1930: 107; Point 1967:62). Several burials have been unearthed in the area, including on the campus of North Idaho College, south of Alternative site "B" It is likely that most areas in the adjacent vicinity of the river contain a prolific cultural record which probably spans many millennia. The reports of amateur artifact collectors bear witness to this, and local collections contain many thousands of artifacts found eroded from the river's edges. Test excavations on the NIC campus and nearby Blackwell Island indicate cultural deposits up to 39 inches in depth (Miller 1953:389, and 1959:39). The historic component of the site, Fort Sherman (1878-1901), has recently been placed on the National Register of Historic Places. An addendum to that listing will no doubt also recognize the aboriginal component of the site.

Recommendations

As mentioned previously, no cultural resources were found on the Alternative "G" parcels of land, and no further archaeological management actions are deemed necessary at this time for these areas. However, if ground-disturbing activities proceed at these sites, workers should be made aware of the possibility of unearthing cultural materials. Should this be the case, excavation work should cease until a qualified archaeologist has been consulted on appropriate procedures.

The interceptor routes in the northern portions of the city cannot be adequately accessed at this time. Therefore, it is recommended that a qualified archaeologist be present during excavation of the lines, until the presence or absence of integral cultural materials can be established.

No further archaeological actions are deemed necessary for site option 2 of Alternative "E", due to the almost total loss of original site materials form quarry activities. However, treatment plant options 1 and 3 in the same alternative, probably have extensive, intact cultural records. It is recommended that these two areas be left undisturbed. If this is not the case, then a program of archaeological test excavation is recommended for these areas, to determine the course of any additional mitigative actions. The interceptor route paralleling the river will need additional investigation when, and if, that proposed route is marked out.

Alternative "B", extension of the present treatment plant, should not be considered as an option of action. This area is within the heart of the most culturally sensitive area of the surrounding region, and should be left intact. Failing this, an extensive testing program is deemed necessary to determine the extent of the archaeological record, for evaluation of National Register of Historic Places eligibility status.

Sincerely,

Daniel M. Mattson

Daniel M. Mattson

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1930 The Salishan tribes of the western plateaus: the Coeur d'Alenes. Forty-fifth Bureau of Ethnology Annual Report.

Personnel Qualifications

Daniel M. Mattson

B.A. in Anthropology from Texas Tech University
M.A. in progress at University of Idaho
Five years of professional experience in archaeological survey, excavation, and cultural resource management.

Michael A. Pfeiffer

B.A. in Anthropology from University of Nebraska
M.A. in progress at University of Idaho
Six years of professional experience in archaeological survey, excavation, and cultural resource management; historic archaeology specialty.

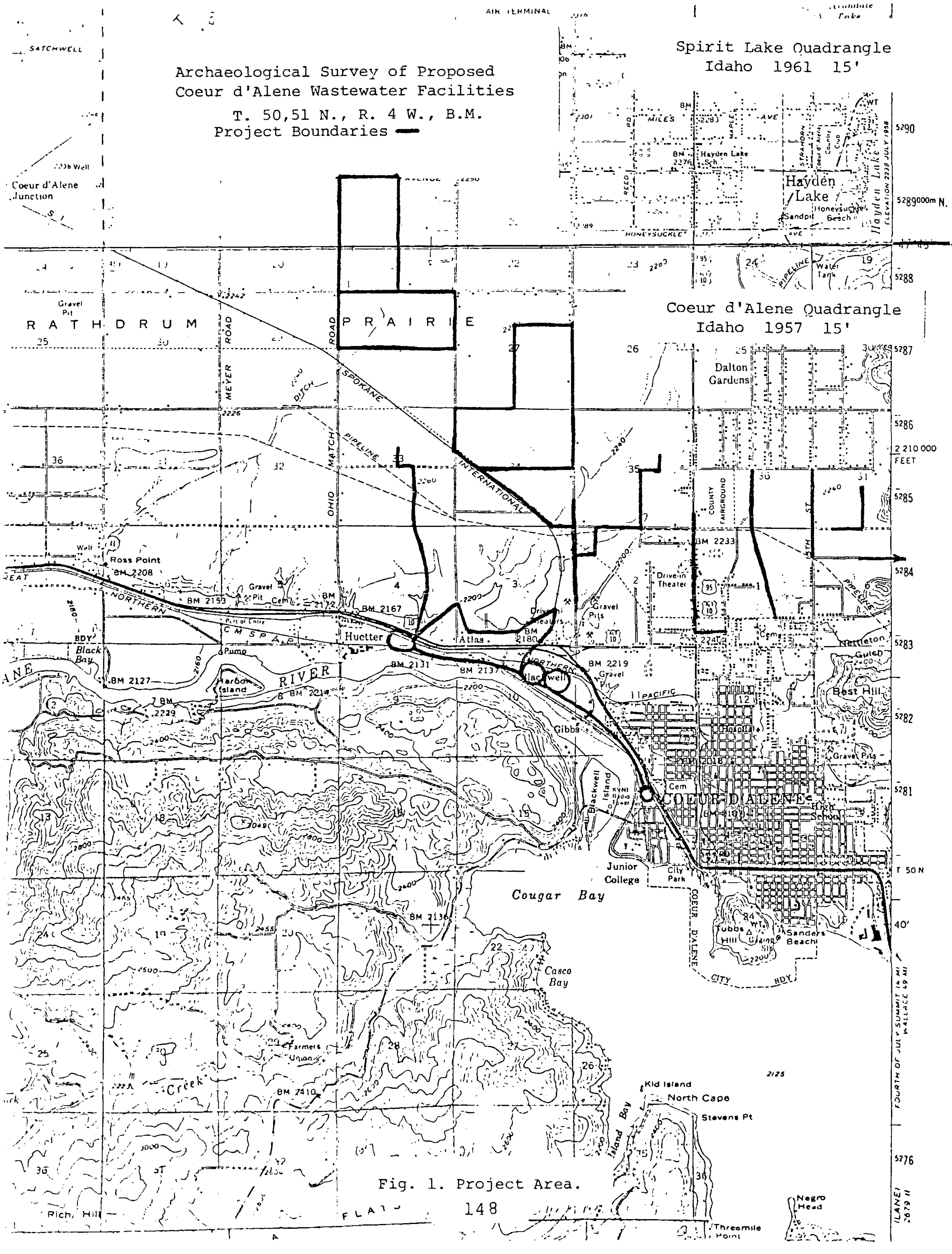

Fig. 1. Project Area.

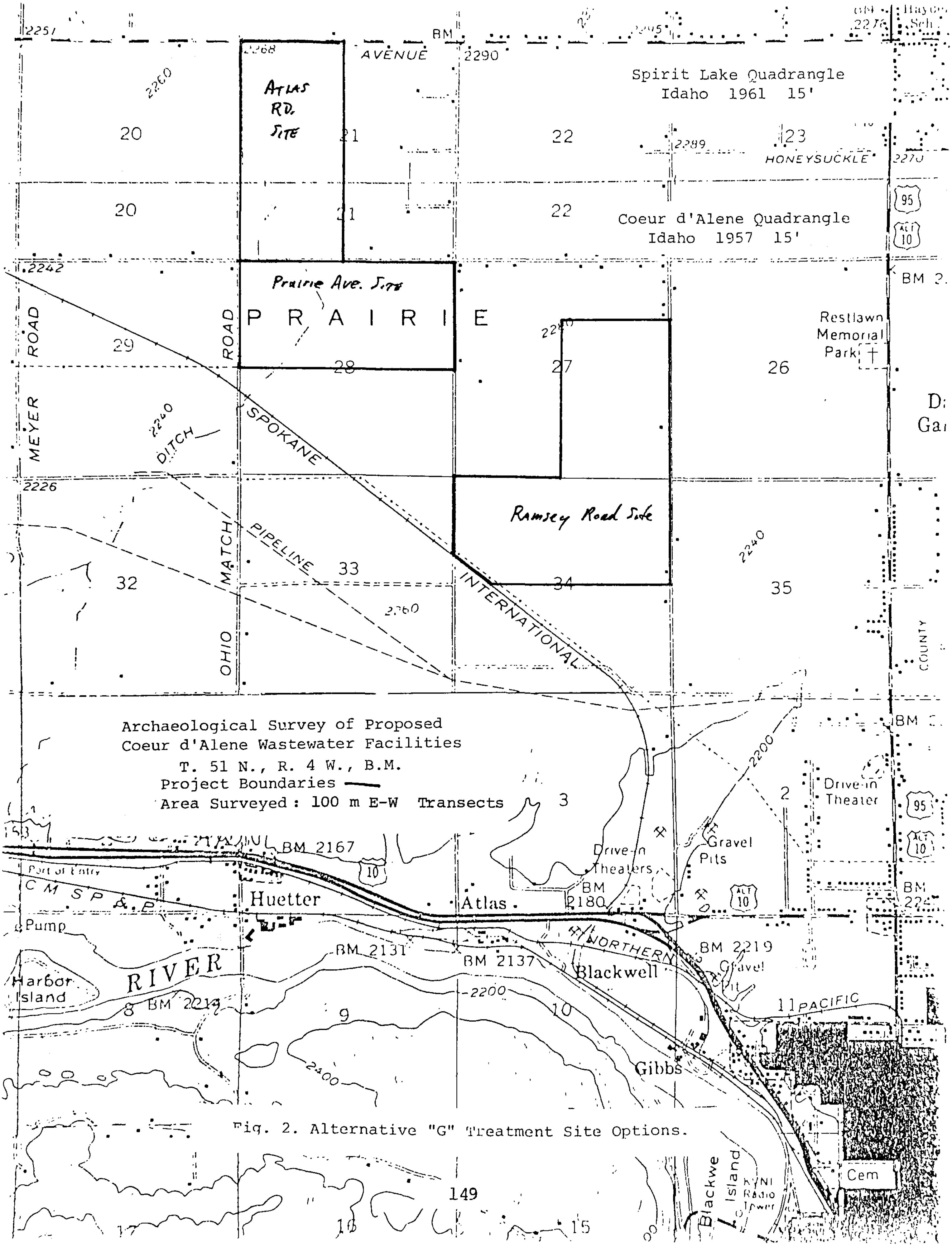

Fig. 2. Alternative "G" Treatment Site Options.

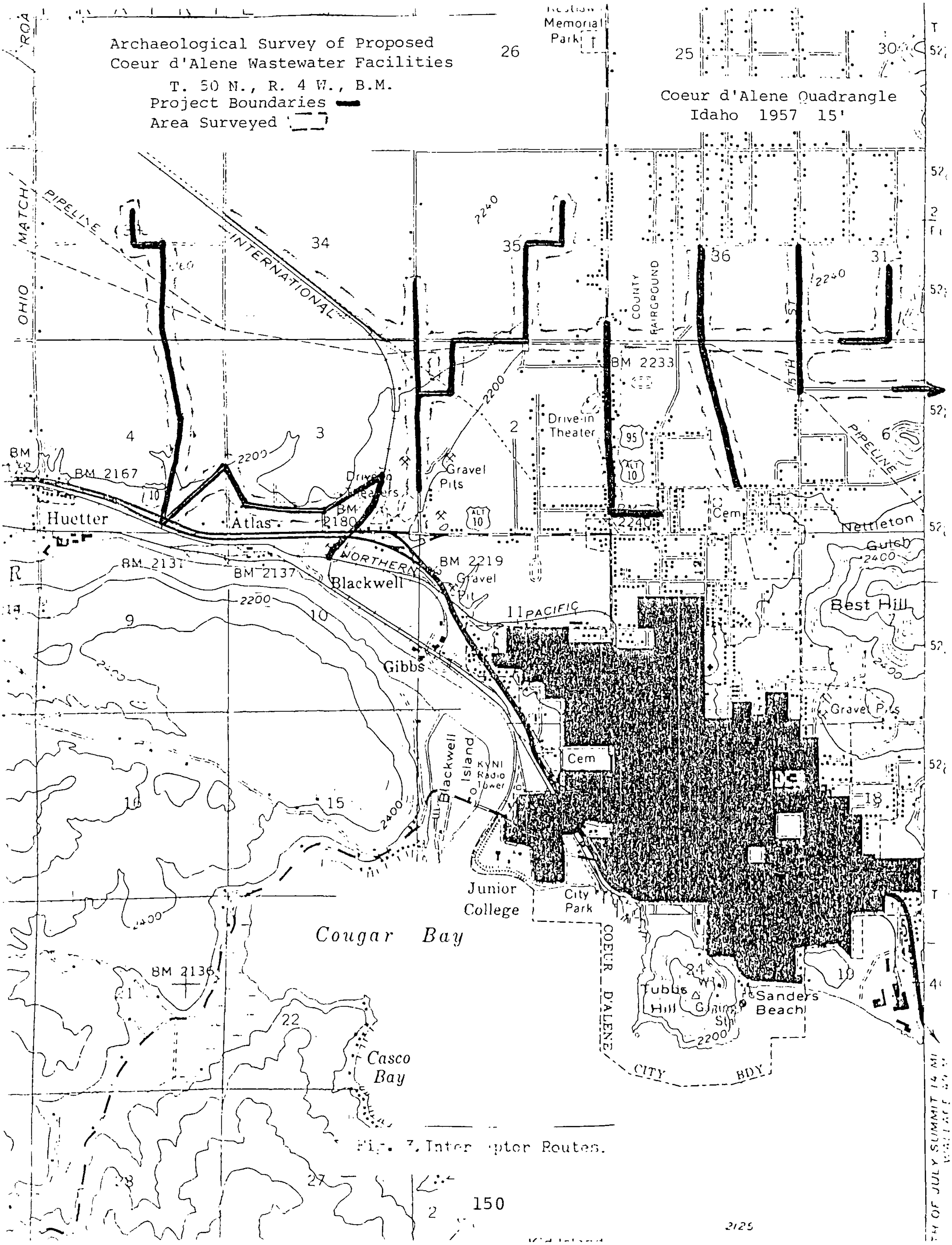

Fig. 7. Interceptor Routes.

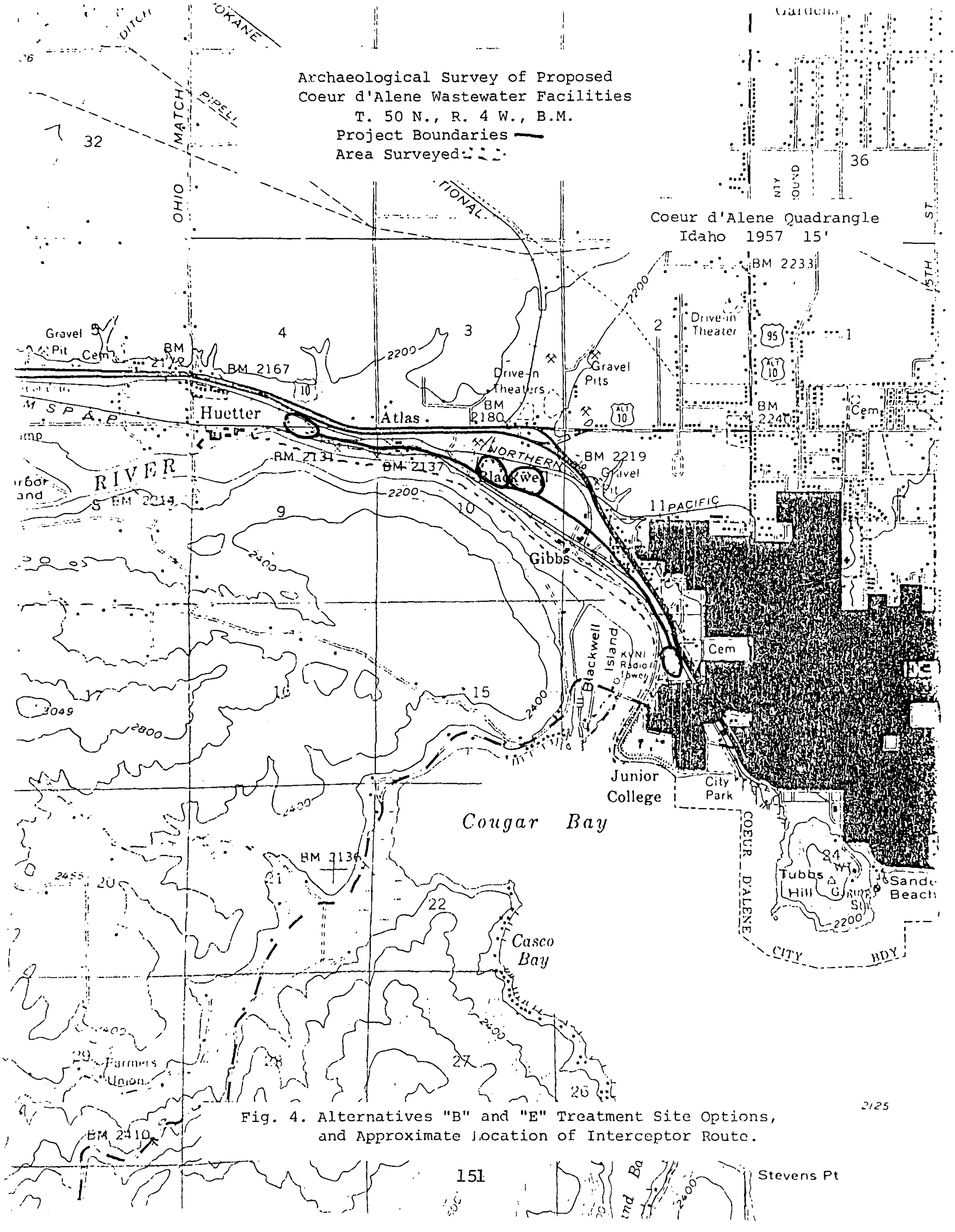

Fig. 4. Alternatives "B" and "E" Treatment Site Options, and Approximate Location of Interceptor Route.

IDAHO STATE HISTORICAL SOCIETY
610 NORTH JULIA DAVIS DRIVE BOISE, 83706

STATE MUSEUM

November 26, 1980

Ms. Norma Young
Environmental Protection Agency, Region 10
1200 6th Avenue South
Seattle, WA 98101

RE: Coeur D' Alene Wastewater Facilities

Dear Ms. Young:

We have reviewed the archaeological survey report for the proposed Coeur D' Alene wastewater facilities prepared by the Laboratory of Anthropology, University of Idaho. The report is well documented and we generally support its conclusions and recommendations.

Thus, no further work is necessary for the treatment facility at alternative G or site option 2 of alternative E. Important archaeological deposits do occur at options 1 and 3 of alternative E and in the area of alternative B. Also any interceptor or collection pipeline near the lake are likely to affect significant archaeological materials. As these areas are eligible/or listed in the National Register a formal Section 106 consultation with the Advisory Council is required if these areas are affected by sewer construction. Prior to the formal consultation with the Advisory Council additional archaeological investigations in the areas of alternatives B and E and along the lake side interceptor routes should be conducted if these alternatives are chosen. Such investigations would consist of excavating small test pits to discover the exact nature of the archaeological deposits. The information could then be used to develop alternate mitigation procedures required by Advisory Council regulations (36CFR800).

If you have any questions concerning these recommendations or EPA's responsibilities please contact me (208-334-3847).

Sincerely,

Thomas J. Green Prb

Thomas J. Green
State Archaeologist
State Historic Preservation Office

cc: Dr. Charles Hazel
Dr. Ruthann Knudson

Appendix B

WATER QUALITY STANDARDS

APPENDIX B

NATIONAL PRIMARY DRINKING WATER STANDARDS

Type of Contaminant	Name of Contaminant	Type of Water System	Maximum Contaminant Level
Inorganic Chemicals	Arsenic	Community	0.05 mg/l
	Barium		1.
	Cadmium		0.010
	Chromium		0.05
	Lead		0.05
	Mercury		0.002
	Selenium		0.01
	Silver		0.05
	Fluoride		
	33.7°F & below		2.4
	53.8 - 58.3		2.2
	58.4 - 63.8		2.0
	63.9 - 70.6		1.8
	70.7 - 79.2		1.6
	79.3 - 90.5	Community	1.4
	Nitrate (as N)	Community & Noncommunity	10.
Organic Chemicals	Endrin	Community	0.002 mg/l
	Lindane		0.004
	Methoxychlor		0.1
	Toxaphene		0.005
	2, 4-D		0.1
	2, 4, 5-TP Silvex	Community	0.01

Total trihalomethanes [the sum of the 0.10 mg/l concentrations of bromodichloromethane, dibromochloromethane, tribromomethane (bromoform) and trichloromethane (chloroform)] 1, 2

Type of Contaminant	Name of Contaminant	Type of Water System	Maximum Contaminant Level
Turbidity	Turbidity at representative entry point to distribution system.	Community & Noncommunity	1 TU monthly average and 5 TU average of two consecutive days (5 TU monthly average may apply at state option)

1. Proposed MCL (Maximum contaminant level)
2. The maximum contaminant level for total trihalomethanes applies only to community water systems which serve a population of greater than 75,000 individuals and which add a disinfectant to the water in any part of the drinking water treatment process.

Type of Contaminant	Name of Contaminant	Type of Water System	Maximum Contaminant Level
Microbiological	Coliform Bacteria	Community & Noncommunity	Membrane Filter* Coliforms shall not exceed: 1 per 100 ml, mean of all samples per month 4 per 100 ml in more than one sample if less than 20 samples collected per month, or 4 per 100 ml in more than 5% of samples if 20 or more samples examined per month.
			Fermentation Tube - 10 ml portion* Coliforms shall not be present in more than 10% of portions per month, Not more than 1 sample may have 3 or more portions positive when less than 20 samples are examined per month, or Not more than 5% of samples may have 3 or more portions positive when 20 or more sample are examined per month.
			Fermentation Tube - 100 m portion* Coliforms shall not be present in more than 60% of the portions per month, Not more than 1 sample may have all 5 portion positive when less tha 5 samples are examined per month, or Not more than 20% of samples may have all 5 portions positive when 5 or more samples are examined per month.

* If sampling rate is less than 4 per month, compliance shall be based on 3 month period unless state determines that a 1 month period shall apply.

Type of Contaminant	Name of Contaminant	Type of Water System	Maximum Contaminant Level
Microbiological	Optional Chlorine Residual	Community & Noncommunity	Minimum free chlorine residual throughout distribution system 0.2 mg/l. (At state option and based on sanitary survey, chlorine residual monitoring may be substituted for not more than 75% of microbiological samples.)
Radionuclides		Community	
Natural	Gross Alpha Activity		15 pCi/l
	Radium 226 + Radium 228		5 pCi/l Screening level: 1. Test for Gross Alpha 2. If Gross Alpha exceeds 5 pCi/l, test for Radium 226. 3. If Radium 226 exceeds 3 pCi/l, test for Radium 228.
Man-made	Beta particle and photon radioactivity	Community	4 millirem/year for total body or any internal organ Screening level: Gross Beta Activity 50 pCi/l Tritium 20,000 pCi/l Strontium 90 8 pCi/l If Gross Beta exceeds 50 pCi/l, sample must be analyzed to determine major radioactive constitutes present; and the appropriate organ and total body doses shall be calculated to determine compliance with the 4 millirem/year level.

PRIORITY POLLUTANTS LISTED IN THE CLEAN WATER ACT

CASE ID.

TYPE 60

Metals (And Metallic Compounds)
Antimony and compounds
Arsenic and compounds
Beryllium and compounds
Cadmium and compounds
Chromium and compounds
Copper and compounds
Lead and compounds
Mercury and compounds
Nickel and compounds
Selenium and compounds
Silver and compounds
Thallium and compounds
Zinc and compounds

Aromatic Hydrocarbons
Acenapthene
Benzene
Ethylbenzene
Fluoranthene
Napthalene
Toluene
Other aromatic hydrocarbons

Chlorinated Hydrocarbons
Chlorinated naphthalenes
Dichlorobenzenes
Other chlorinated benzenes
Dichloroethylenes
Chlorinated ethanes
Dichloropropane and dichloropropenes
Hexachlorobutadiene
Hexachlorocyclopentadiene
Polychlorinated biphenyls
Tetrachloroethylene
Trichloroethylene
Vinyl chloride

Halomethanes
Carbon tetrachloride
Chloroform
Other halomethanes

Phenols
2—chlorophenol
2, 4—dichlorophenol
Pentachlorophenol
Other chlorinated phenols
2,4—dimethylphenol
Nitrophenols
Phenol
Other phenols

Pesticides
Aldrin/Dieldrin
Chlordane and metabolites
DDT and metabolites
Endosulfan and metabolites
Endrin and metabolites
Heptachlor and metabolites
Hexachlorocyclohexane
Toxaphene
Other pesticides

Others
Acrolein
Acrylonitrile
Asbestos
Benzidine
Chloralkyl ethers
Cyanides
Dichlorobenzidine
Dinitrotoluene
Diphenylhydrazine
Haloethers
Isophorone
Nitrobenzenes
Nitrosamines
Phthalate esters
2,3,7,8—tetrachlorodibenzo-p-dioxin (TCDD)

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Appendix C

EIS DISTRIBUTION LIST

COEUR d'ALENE, IDAHO EIS DISTRIBUTION LIST

Federal Agencies

Advisory Council on Historic Preservation
U.S. Department of Agriculture
  Farmers Home Administration
U.S. Department of Commerce
  National Marine Fisheries Service
U.S. Department of Defense
  Corps of Engineers, Seattle District
U.S. Department of Health, Education & Welfare
U. S. Department of Housing & Urban Development
U. S. Department of Interior
  Fish and Wildlife Service
U. S. Department of Transportation
  Federal Highway Administration

State Agencies

Idaho Air Quality Bureau
Idaho Division of Environment
Idaho Fish & Game Department
Idaho Transportation Department
Panhandle Area Council
Panhandle Health District
State Clearinghouse

State and Local Officials

Office of the Governor
Donald E. Johnston, Mayor
G. Eugene McAdams, City Administrator
Tom Wells, Director, Public Works
John Carpita, Kootenai County Engineer
Kootenai County Commissioners
Art Manley, State Senator
Gary J. Ingram, State Representative
L. C. Spurgeon, State Representative

Organizations

Idaho Wildlife Society
Kootenai Environmental Alliance
League of Women Voters of Idaho

Local Distribution

Evalyn Adams
Jerry Adams
Wally Adams
John Aguilar
Eugene M. Ballou
Jim Bellamy
Elton Bentley
Ronald Briggs
Roger Brockhoff
Brown & Caldwell, Seattle, Washington
Jim Burns
Ray Capaul
Marjorie Chadderdon
Coeur d'Alene Press
Coeur d'Alene Public Library
Larry Comer
Lloyd L. Conrad
Lee Dean
Bill DeCroff
John DeSelle
Everett Dicksion
Val Dicksion
Ford Dunton
Loren R. Edinger
Frank Elkins
Dave Finkle
Art Flagan
Jim Fromm
Jim Fullmer
Bill Goodnight
Russell Greenfield
Joe Haines
Ellen Healy
Kent Helmer

COEUR d'ALENE, IDAHO EIS DISTRIBUTION LIST

Local Distribution (Continued)

Frank Henderson
Martha Higgins
Edwin H. Jones
Lester A. Jones
Kenneth S. Kirking
Ray Koep
KVNI
Lois Land-Albrecht
LePard & Frame, Inc.
Tom Liston
Jim Markley
Bill McFarland
Charles McLain
Brian Meckel
Meckel Engineering & Surveying
Ted Menzel
Rosalie Moore
Ed Morse
Ted Mueller
Ward B. Newcomb
Dan Paulson
Charles Pearson
John A. Pierce
Post Falls Public Library
David Priano
Tom Price
Hester Pulling
Mary Lou Reed
Joe Roope
Lester E. Routh
Herb Sanderson
Clifford Schoener
Lorna Sears
Bryan Shertz
Jack Simpson
Elizabeth Sowder
Spokesman-Review
Jack Spurgeon
Jim Stravens
Whitey Swendener
Fay Sweney
David Tyler
URS Company, Spokane, WA
Roy Wargi
Joseph G. Wark, Jr.
Bill Wassmuth
Roy Wellman
Dave Yadon

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