Adopted by RPC - 3-3-81

March 10, 1980

TO: Regional Planning Council

FROM: Richard T. Howsley, Executive Director
The 208 Water Quality Management Committee

SUBJECT: Resolution # For the Purpose of Adopting the Salmon Creek Pollution Control Plan

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Background

The Salmon Creek Pollution Control Plan is the element of the 208 Planning Program that recommends actions to be taken which will provide pollution control in the Salmon Creek Basin. It was developed as an expansion of the Water Quality Management Plan adopted by the Regional Planning Council in 1978. Many of the recommendations are currently being undertaken; however, this overall plan is required by EPA for assurance action will continue.

Budget Implications

None, funding for each element of the plan is designed to come from the affected local agency.

Policy Implications

Adoption of this plan will provide water quality policies for the Salmon Creek Basin.

Action Requested

Adoption of Resolution.

CLARK COUNTY
DEPT. OF PUBLIC WORKS
Date: 9/17/80

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- Support Services
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✓ File: 1002-8

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SALMON CREEK POLLUTION CONTROL PLAN

I. INTRODUCTION

"Salmon so thick we caught them with a pitchfork. People would catch wagon-loads in only a few hours."

That's the way it was in Salmon Creek 40 years ago. But the salmon are gone today, victims of pollution, dams and alteration of the small stream habitat. Attempts to restock the Creek have failed the past few years.

While those older days of "fish so thick you could walk across the stream on them" will probably never return, there is no reason why Salmon Creek cannot be restored as a productive salmon stream.

Similarly, kids in Felida, Pleasant Valley, Brush Prairie, Battle Ground, and many other locales used to escape the mid-summer heat by dousing themselves in Salmon Creek. Today the same stream is a health hazard from Felida to Venersborg. This plan is intended to mobilize public and private actions to reverse this deterioration in Salmon Creek and make it safe again for people to enjoy and fish to spawn and thrive. If people act together, these goals can be achieved speedily. If we do not cooperate, the costs will be high - in added costs for pollution controls and in lost recreation and local pride. The time to act is now.

A. How the Plan Was Developed.

Under the Federal Water Pollution Control Act Amendments of 1972 (PL 92-500), Americans made a commitment to achieve "swimmable and fishable waters" nationwide by 1983. In July, 1975 the Clark County Clean Water Program was initiated by the Regional Planning Council (RPC). The Program's purpose was to develop practical and implementable solutions to the major water pollution problems remaining in the County, and to assure that the national objectives are achieved. In fact, Section 208 of the Act above requires that strategies to meet these objectives be developed locally.

From 1975 to 1977, the Clean Water Program developed three plans, "Vancouver Lake Restoration," "Burnt Bridge Creek Drainage Management", and "Water Quality Management Plan". The latter focused on the pollution problems in the Salmon Creek, Lacamas Creek, Lake River, and Washougal River drainage basins. It showed that Salmon Creek was becoming seriously polluted from as far east as Venersborg and Hockinson all the way to its mouth, and that the pollution sources were scattered throughout the basin and on

almost every tributary. Sources included failing septic tanks, livestock operations, erosion from construction sites, storm runoff from urban areas, and sewage treatment plant discharges. Furthermore, water quality was deteriorating as development expanded, just as it had in Burnt Bridge Creek the previous two decades.

This plan was funded in part by a grant from the U.S. Environmental Protection Agency through the State Department of Ecology. It builds upon the findings and recommendations in RPC's "Water Quality Management Plan" (1978), Clark County Sewer District No. 1's "Comprehensive Sewer Plan" (1978), and the "Facilities Plan for the Meadow Glade, Hockinson and Brush Prairie Area" (1977 by Cooper & Associates). It attempts to focus these and other public and private efforts into a clear strategy for restoring Salmon Creek as a safe place for people and salmon.

Many local agencies are already involved in this project. The Southwest Washington Health District (SWHD) has been measuring stream pollution and locating septic tank failures and other pollution sources since 1974. The Clark County Conservation District has been working with livestock operators offering assistance in improved waste management practices. Clark County Sewer District No. 1 has been building vitally needed sewer lines in the Hazel Dell area, and Clark County is now demanding that storm runoff from new developments be of essentially the same quality and quantity as it would have been prior to development. Several other local and state agencies are also involved. As its role, the Regional Planning Council attempts to provide the glue to bring all of these efforts together.

B. Relationship of This Plan to Other Programs.

This pollution control plan is closely tied to sewering programs, drainage planning, and park development in the basin. Existing sewer plans for Sewer District No. 1, Clark County and Battle Ground are built into this plan. However, where additional sewer planning is needed, this plan presents policies and criteria to guide those plans. The significance of this is that in order to qualify for Federal or state funding assistance, any future sewer planning or construction would have to be consistent with this plan, as adopted or subsequently revised.

Simultaneous with development of this plan, the U.S. Army Corps of Engineers - at RPC's request - has been preparing a drainage management plan for the Salmon Creek basin. These two plans are highly complimentary.

The Corps' plan aims at correction and prevention of flooding and stream bank erosion problems. This plan would definitely be beneficial to water quality, in fact, some of the new regulations recommended there are also recommended in this plan; but it appears that the drainage improvements would not be a top priority on the list of water quality needs. Therefore, it is recommended that the two plans be evaluated separately on their own merits.

Since 1975 Clark County has been working to acquire and develop Salmon Creek Park, a park that will eventually extend from Highway 99 to Lake River. Although the first phase of park development focused on a swimming area at Klineline Pond, future phases are intended to relate more closely to Salmon Creek. However, as long as Salmon Creek remains a health hazard, recreational use of the greenway will be far below its potential and the public will be unable to capitalize on their park investment.

C. Basin Description.

Located just north of Vancouver, the Salmon Creek basin drains 91.5 square miles in Clark County. The basin and the principal streams are depicted in Figure 1. Salmon Creek flows westerly approximately 23 miles from the foothills of the Cascades east of Venersborg to Lake River near Felida. Terrain in the basin is generally flat, but becomes hilly as one moves east. Elevations range from less than 10 feet at the confluence with Lake River to over 2,000 feet in the foothills.

II. POLLUTION PROBLEMS AND CAUSES

Salmon Creek today is seriously polluted. At the headwaters water quality meets the State Class A water quality standards, but deteriorates rapidly downstream. Many sources of fecal coliform have been identified and a few eliminated. Nevertheless, the waters from Brush Prairie to Lake River far exceed the fecal coliform standard and may be considered hazardous for human contact. This is also illustrated by the water quality monitoring results since 1974, which are shown on Figures 2, 3 and 4. Additional water quality data on Salmon Creek and its tributaries is included in Appendix A.

Evidence of this health hazard was found in the summer of 1977. Numerous children who played in the Creek at the County's Salmon Creek Park developed infections. In response to these incidents the Health District decided to post pollution warning signs. These and other children may indeed have been fortunate, for such serious diseases as hepatitis, typhoid fever and amoebic dysentery can be contracted from such polluted water.

The principal sources for this contamination are animal wastes and failing septic systems. These sources are scattered through much of the basin. In addition, certain components of animal waste and septic leachate frequently exceed the tolerance limits of salmonids, resulting in high mortality for them.

Septic tanks can cause pollution in several ways. First, a tightline may be used. In this practice, the drainfield is bypassed and the sewage discharged directly through a pipe into a stream or drainage way. Secondly, the water table may rise or the soils in the drainfield may become saturated, causing the sewage to come to the surface. This condition is common in Meadow Glade, for example. Third, the sewage may pass through a shallow gravelly soil, then reach a clay layer over which it travels laterally until it surfaces in a stream or low area. Glenwood Creek near Barberton evidences this condition.

One of the significant implications of the three types of septic tank pollution is that only in the second case does the homeowner see his own sewage. In the other two instances the homeowner is rarely even aware that his septic tank is not working properly. Therefore, he will usually oppose sewer construction to replace his failing system. This is one of the reasons that septic tank pollution is tolerated for so long.

While bacterial pollution makes the Creek unsafe for people, it has little impact on aquatic life. The accompanying high nutrient loads, however, may have a definite adverse effect on game fish. Fish and aquatic life are also directly affected by turbidity, sedimentation and toxic contaminants. These pollutants have contributed to depleted salmon and steelhead runs in Salmon Creek and reduced trout populations. Turbidity, which fish will attempt to swim away from, and sedimentation, which can bury food and spawning beds, have been due principally to erosion from construction sites and stream banks. Historically, all types of construction - highway and road, housing, commercial and utility - have contributed.

Game fish are also highly sensitive to toxics such as oil, grease, lead, iron and cadmium. These materials tend to accumulate on roads, parking lots, and roof tops until a rain comes and flushes them down a storm drain and into the nearest stream. This storm water is generally called, "urban runoff". Urban runoff contaminants tend to have the greatest impact because of the high concentrations entering a stream during a storm event. These occasional heavy doses can cause high mortality among many of the small forms of aquatic life which occupy key places in the food chain. Their death will ultimately mean lack of food for the game fish which are at the top of the food chain in the stream environment and, therefore, fewer game fish.

Other factors which have affected fish populations in the basin include excessive water temperatures, predation by warm water fish in Lower Salmon Creek and Lake River, and occasionally prolonged low summer flows. Excessive water temperatures have been found at all three regular monitoring sites on Salmon Creek and in Morgan Creek. These temperatures may be a natural condition or may be effected by warm discharges such as sewage plant effluents and animal wastes, or by diversions for stock watering, irrigation, or other use. Temperature does appear to be a limiting factor, however, for species such as Coho salmon, which reside for a full year in the stream prior to their ocean migration.

Compounding the temperature problem for the salmon is the presence of competing or predatory species such as bass, catfish, and carp in Lake River and Lower Salmon Creek, which thrive in these elevated temperatures. Fisheries experts believe that numbers of these predators have increased in the last 30 years. A general reduction in stream temperature would not only improve the habitat for salmonids, but would reduce the numbers of these competing fish species, as well.

Stream flow records for Salmon Creek indicate extreme fluctuations have occurred in the past, ranging from 2 to 1,200 cfs east of Brush Prairie. Low summer flows may be related to excessive water temperatures. In addition, they reduce the suitable rearing area, a significant factor in limiting Coho production.

The combined effects of all the pollutants in Salmon Creek on game fish have been apparent to most fishermen for several years. Survey data by the State Fisheries Department clearly document a decline in spawning salmon since 1964. Coho still use the upper reaches, but are in low abundance. Due to the poor survival rates the Department has attempted only sporadic planting during the 1970s, though they did attempt to plant Coho eggs in upper Salmon Creek for the first time in 1979.

The good news, though, is that a stream is remarkably resilient. Even when pronounced "dead", as was Lake Erie, a stream can cleanse itself and become "healthy" again, often in just a few years, provided that the pollution which led to the "sick" condition is halted. Today Salmon Creek, Mill Creek, Wooden Creek, and Cougar Creek are sick, but we can make them healthy again.

The following is a more detailed analysis of the water quality in the major streams in the basin. All the known problems are also illustrated on Figure 5.

A. Headwaters.

All water quality parameters for Salmon Creek above N.E. 199th Street are well within the State Class A standards. However, increases in fecal coliform below Venersborg indicate septic tank problems from that area. In addition home and road construction in the Venersborg area have caused erosion and high turbidity in the stream.

B. Morgan Creek.

High fecal coliform and turbidity levels due to septic tank problems and animal wastes prevent Morgan Creek from meeting the Class A standards. Attempts to monitor sources of the suspected septic tank contamination were abandoned due to an inability to segregate these potential sources from the livestock scattered in the Morgan Creek drainage. However, sanitary surveys conducted by the Health District in Hockinson did show evidence of septic tank problems at 44 percent of the homes examined.

C. Wooden Creek.

Monitoring indicates that Wooden Creek (also known as Weaver Creek) does not meet the Class A water quality standards. Above Battle Ground, high fecal coliform, turbidity, and organic contaminants from dairy drainage and failing septic tanks degrade the stream. The Battle Ground Sewage Treatment Plant has caused other problems. In 1978 the Department of Ecology (D.O.E.) discovered that a high ammonia concentration in the treatment plant effluent was causing dissolved oxygen (D.O.) levels in the stream to fall from 9 milligrams per liter (mg/l) to 3 mg/l before recovering.[1] The D.O.E. study concluded that D.O. levels were well below the Class A standard of 8.0 mg/l for about 2.6 kilometers (1.6 miles) downstream of the plant outfall. It found aquatic life in this reach already stressed and predicted that "even slightly lower dissolved oxygen values could decimate Weaver Creek's biological community." The ammonia concentrations are also sufficient to be toxic to sensitive species. Together, the low D.O. and high ammonia levels may be the reason salmon have not been seen in Battle Ground for several years.

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[1]Moore, Allen and Darrell Anderson, Weaver Creek - Battle Ground Sewage Treatment Plant Impact Study, Washington State Department of Ecology, December, 1978.

D. Columbia Academy Tributary.

This tributary, which flows through Meadow Glade, does not meet Class A standards. High fecal coliform levels are attributed to failing septic tanks and the Columbia Academy Sewage Treatment Plant, which frequently does not meet its discharge permit limitations. Septic tank problems in Meadow Glade have been documented in sanitary surveys by the Health District in 1973 and 1978. In 1978, 22 percent of the homes surveyed showed evidence of failures.

E. Glenwood Creek.

Glenwood Creek is polluted near its source. Drainage near Green Meadows Golf Course and Sunnyside Drive is contaminated by sewage from septic tanks. This is one of the fastest growing areas in the County and sewer service is urgently needed. Construction of the necessary sewer interceptor was delayed in 1978 for lack of an acceptable financing proposal. A new financing proposal is currently being developed. Further downstream animal wastes may also be contributing to the pollution.

F. Mill Creek.

Extensive sampling of Mill Creek by both Southwest Washington Health District (SWHD) and the State Department of Ecology (DOE), has documented that it is heavily polluted. Two major dairies appear to have been the major contributors. Fortunately, operators at both of these dairies are working with the Conservation District to solve these problems and are making progress. Lesser pollution contributions in Mill Creek are suspected from other dairies and septic tanks.

G. 119th Street Tributary.

Limited sampling on this stream has shown fecal coliform levels as high as 24,000. Septic tanks in the vicinity of N.E. 109th Street appear to be the cause.

H. 114th Street Tributary.

Sewer construction completed in 1978 has reduced the fecal contamination in this stream, though septic tanks further upstream are still polluting. Extension of the sewer line to pick up these other problems would greatly improve the water quality.

I. Tenny Creek.

In the single sampling performed in Tenny Creek, high fecal coliform, nitrate, and conductance levels were found, indicating the need for more investigation. A sanitary survey in May, 1979 of one subdivision near the Creek showed that 50 percent of the homes were having septic tank problems. Health officials suspect that similar conditions may exist elsewhere, as well.

J. Cougar Creek.

Cougar Creek is probably the most highly polluted stream in the basin. It has excessive levels of fecal coliform, turbidity, and oil. Septic tanks are the most likely source of the bacterial contamination, though the actual source(s) has not yet been determined. The new Cougar Creek sewer interceptor (currently under construction) once fully utilized, should greatly reduce this problem.

Unfortunately, the construction of the sewer has had a significant adverse effect on the stream. Because of erosion and sedimentation, high turbidity and siltation of the stream bed have resulted. This burial of the natural stream bed is a significant habitat loss for the fish and other aquatic life which inhabited the Creek. In time the stream should recover, but only if other major pollution is prevented.

Cougar Creek also receives most of the toxic pollutants which accumulate on the highways, roads, and parking lots in the Hazel Dell area. Based on limited sampling to-date,[2] concentrations of these pollutants do not appear to be great enough to threaten aquatic life in Cougar Creek. Nevertheless, these conditIons should continue to be monitored in future years.

K. Lower Salmon Creek.

For this report, Lower Salmon Creek refers to the portion of Salmon Creek downstream (west) of NE 50th Avenue. In addition to receiving much of the pollution from Mill Creek, Cougar Creek, 114th Street and 119th Street tributaries, and several smaller streams, it receives septic tank effluent from some nearby homes and runoff from I-5 and Highway 99. In 1978, a motel on Highway 99 was discovered emptying its sewage into the Creek. Similarly, a home built on the bank above the Creek was discovered pouring sewage into the stream. Sewer connection has been required at both locations.

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[2]U.S. Geological Survey, Preliminary Report: "Benthic Invertebrates, Periphyton and Bottom Material and Their Trace-Metal Concentrations in Salmon Creek Basin, Clark County, Washington".

III. FINDINGS AND CONCLUSIONS

A. Salmon Creek is polluted and unsafe for swimming or salmon rearing. The pollution extends from Venersborg to Lake River and is also found the length of Wooden Creek, Glenwood Creek, Cougar Creek, Mill Creek, Tenny Creek and many smaller tributaries. Septic tanks, livestock wastes, erosion from new construction, and contaminants from roads and parking lots are the biggest pollution sources.

B. Salmon Creek is a historically significant salmon stream. Prior to the mid-1960's there were major salmon runs on Salmon Creek and its tributaries. The magnitude of these runs first prompted the stream's name.

C. Deterioration of the salmon fishery has largely been due to pollution, particularly from past and present development. High turbidity, sediment deposit on gravel spawning beds, excessive nutrients and low dissolved oxygen resulting from human and animal wastes entering the stream, predation by warm water fish, destruction of other aquatic life, and excessive water temperatures have combined to make Salmon Creek and its tributaries almost unlivable for salmon, though a small steelhead run still exists.

D. Salmon Creek can be rehabilitated. Streams are remarkably resilient. If the pollution is halted, healthy aquatic life will usually return in only a few years. If present pollution sources are eliminated and new sources prevented, Salmon Creek should again be safe for people, fish, and wildlife.

E. Salmon Creek is an important County resource. The importance of Salmon Creek is tied directly to its natural beauty and recreation potential. These can only be protected by a clean and living stream. Recognition of Salmon Creek's importance and value to the community was evidenced by creation of Salmon Creek Park. Now utilization of the park is limited by the stream pollution. The scenic beauty of Lower Salmon Creek has also been recognized by nomination of the lower valley as a Heritage site. Similarly, Battle Ground's adoption of a greenway ordinance indicates the importance which they attach to Wooden Creek.

IV. RECOMMENDATIONS

Human and animal wastes appear to be the most significant contributors to the present pollution problems in the Salmon Creek basin. Together, they cause most of the major streams to be considered hazardous for human contact. It is clear that Salmon Creek will not meet the state standards for swimming until the pollution from both sewage and livestock is eliminated. Furthermore, the sources of this pollution are so scattered that success will require real diligence by the responsible agencies and continued public concern.

While correction of the pollution problems above will also improve fish habitat in some streams by reducing nutrient levels and increasing dissolved oxygen, rejuvenation of the salmon, steelhead, and trout fisheries may depend more on prevention of erosion and sedimentation, and maintenance of cool summer stream temperatures. Although these programs are of a lower priority than those associated with sewage and animal wastes, they should proceed concurrently in hopes of meeting the Congressionally mandated goal of swimmable, fishable waters by 1983.

Septic tank pollution will require the longest time and most money to eliminate. Currently, correction is limited by five factors: (1) lack of an adopted sewer plan by the County to enable sewer construction; (2) absence of an adequate financing program to carry out a sewer construction program; (3) the high cost of sewer hookup and consequent frequent unwillingness of homeowners to build lateral sewers or connect to them once built; (4) poor drainage in septic tank areas; and (5) inadequate maintenance or overloading of septic tanks.

The recommendations presented below are grouped according to the problem type, and within each type they are listed in order of priority.

A. Sewers and Sewage.

1. Sewer interceptors in the Lower Salmon Creek basin should be constructed as rapidly as possible. A list of projects and recommended schedule for their construction is shown in Table 1. All present septic tank problems should be addressed by the projects built in the next 5 years. Furthermore, Clark County and the City of Battle Ground cannot begin their construction programs until the planning called for in the following recommendation is completed. Total cost for these facilities is not known yet, but is estimated at $5,288,000 (1977) for the Sewer District projects, alone.

2. A master sewer plan for the basin should be prepared. This plan should build upon the Sewer District's Comprehensive Sewer Plan and specify the sewerage facilities that will be needed in the County's service area and in the upper basin. It will identify requirements for upgrading and expanding Battle Ground's treatment facilities and recommend any facilities which may be needed for the Meadow Glade and Hockinson communities. It will also recommend how to finance all of these improvements. The plan is estimated to cost $146,650, and is included in the 1979-1980 208 Work Program. Federal funds will provide $85,650 of the cost, with the County's sewer fund expected to pay the balance of $61,000.

3. Clark County and Clark County Public Sewer District No. 1 should sponsor additional investigations over the next 2 to 5 years to document septic tank failures or contamination. The purpose would be to increase chances for Federal and state sewerage grants, and to build local support for utility local improvement districts. Annual costs are estimated at $15,000 to $25,000, assuming the work is performed by the Southwest Washington Health District. Costs through 1980 are included in the $61,000, identified in Recommendation No. 2.

4. If the County decides to recommend construction of sewage collection systems for Meadow Glade and Hockinson, the sewage should be transported via force main to the Salmon Creek Interceptor for treatment at the Salmon Creek Treatment Plant.

5. For existing urban density developments which do not connect to sewer when it is available, Clark County should consider establishing a policy requiring sewer connection and a timetable for compliance.

6. The Southwest Washington Health District should increase its educational programs for proper septic tank operation and maintenance. Funding would be through existing assessments and assistance from special interest groups.

7. The Southwest Washington Health District should continue to evaluate the feasibility of on-site sewage disposal management programs where septic tanks are generally not suitable, and sewers would be either inconsistent with the County Comprehensive Plan or too costly. However, until state or Federal funds are provided, this work should remain a low priority.

B. Animal Waste Management.

1. The current Animal Waste Management Program directed by the Clark County Conservation District should continue at its present level through at least 1982. Funding for the Conservation District and water quality monitoring support by the Health District should be assumed by Clark County beginning in 1980. Annual cost for this program County-wide will be about $28,000.

C Erosion Control.

1. Clark County and the City of Battle Ground should adopt regulations to prevent erosion from construction and clearing activities, and sedimentation in waterways and drainage facilities. These regulations are also recommended in the Salmon Creek Drainage Management Plan prepared by the U.S. Army Corps of Engineers.

2. A training program for inspectors should be established to assist them in enforcing the above regulations.

3. An education program for developers, builders, and engineers should be initiated by the County Public Works Department to provide technical assistance in erosion and sedimentation controls.

Costs to implement this Erosion Control Program through 1980 will be provided through a 208 grant. Thereafter it must be self-supporting or funded by the local governments.

D. Continuing Planning.

1. The Regional Planning Council should review progress on implementation of this plan at least annually and update the plan, as needed.

2. The Regional Planning Council should study the causes of excessive stream temperatures in the basin and develop recommendations for preventing them. This project should be coordinated with the State Fisheries Department and funded through the 208 Program. No cost estimate is yet available.

3. RPC should continue to publicize both successes and pollution problems. This publicity may be through signs, reports, the media, or other means.

4. Impacts from urban runoff contaminants on water quality and aquatic life in Salmon Creek and Cougar Creek should be reevaluated in 2 to 3 years. Presently no additional controls on these contaminants appear necessary to meet national water quality goals.

E. Costs for Implementation.

The proposed plan will cost approximately $7.3 million to implement, though 96 percent of this cost is for construction of sewerage facilities, which are already planned and mandated. Federal and state grants will be sought for those facilities which are needed to solve existing health or pollution problems. However, the facilities intended primarily to accommodate future growth or development - which are the majority - must be financed entirely locally. The local share of these sewerage costs are expected to be generated by assessments against new developments.

Two other major costs are not included in the plan: (1) construction of lateral (collector) sewers; and (2) construction of animal waste management facilities. The former is financed by the actual sewer users through creation of utility local improvement districts. The latter, similarly, are paid for by the livestock operators, though they may receive some Federal cost-sharing funds. These Federal funds usu ally represent much less than 50 percent of the total cost of new facilities. Though this total cost is not yet known, an average investment of $15,000 - which is a reasonable figure - by each of the 28 dairy operations in the basin would total $420,000.

The other public costs for the plan amount to $310,650, which covers 1979-1983. Of this figure, Federal 208 planning funds are providing $105,650. Therefore, new local government costs resulting from this plan amount to only $204,850, or an average of $41,000 annually for 5 years. These costs, while less than 4 percent of the cost for new sewer interceptors, are just as vital and significant for achievement of the water quality goals in Salmon Creek.

Implementing the plan should assure by 1983 that most of Salmon Creek will again be safe for swimming and for salmon, steelhead, and trout spawning and rearing. The State Fisheries and Game Departments will be able to step-up their stocking programs. As a result, recreational use of the streams, and particularly Salmon Creek Park, will multiply, and property values near Salmon Creek will appreciate.

The plan costs are summarized in Table 2.