

WATERSHED MANAGEMENT
IN THE JOHNSON CREEK BASIN

by

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WATERSHED MANAGEMENT
IN THE JOHNSON CREEK BASIN

ABSTRACT: The Johnson Creek Basin, Oregon is an example of the physical and jurisdictional problems often associated with watershed urbanization. Implementation of solutions to problems of water quality and quantity in the basin have been hindered by political and social constraints. Reasons for the failure of previous management proposals are analyzed through application of institutional evaluation criteria. Alternative solutions are described and key considerations toward implementation of an effective basin wide management scheme are found to be political coordination, an equitable funding program, and generation of public support.

INTRODUCTION

Hydrologic changes resulting from urbanization of watersheds often lead to severe problems involving quantity and quality of streamflows. Whereas the physical impacts on

the stream system can be lessened through application of currently available management techniques, political and social constraints may limit the possibility of developing and implementing an effective watershed management program. The Johnson Creek Basin near Portland, Oregon exemplifies the consequences of watershed urbanization as well as many of the socio-political barriers which can prevent the implementation of solutions.

A discussion of the situation in this basin has wide geographic applicability since similar sets of problems have developed in other watersheds following development. The replacement of natural vegetated land with urban uses is reflected in the stream system by greater variability of water flows and a general deterioration of water quality. The results of these changes include increased risk of flooding, loss of stream habitat, and loss of recreational opportunities. An urban stream may be transformed from a valuable aesthetic asset into a potentially damaging liability.

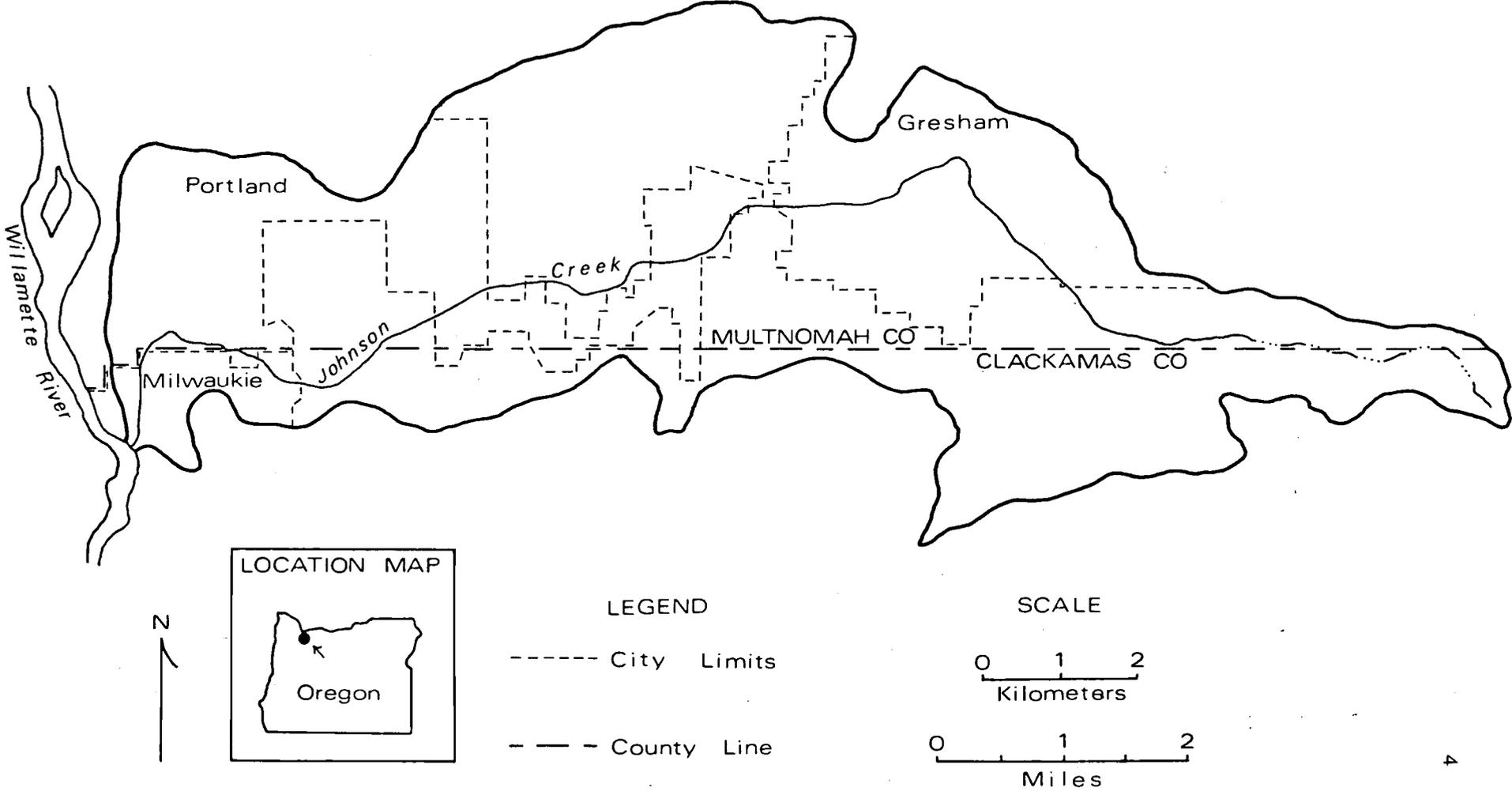
Drainage management is a function which has been undertaken by the public sector in most urban areas. A conflict often arises when political jurisdictions do not coincide with the natural drainage system. Political coordination of the two counties and three major cities which occupy the Johnson Creek Basin has been an ongoing

problem in attempts to devise a comprehensive management policy. (Figure 1) Programs in the past have also failed to be implemented due to lack of public support, which is closely related to the difficulty of obtaining the financing necessary to any proposal. The issue of funding can be expanded to include the determination of who should pay for watershed management in urban areas. Should the costs be borne by the direct beneficiaries such as flood plain residents, by all the residents of the basin, or by the general public through tax inputs? Also demonstrated in the Johnson Creek situation is the characteristic gap between the "paper authority" given to government agencies and the practical constraints which limit the full application of their authority.

PHYSICAL BASE

Johnson Creek, with a main stem length of 24 miles (39 kilometers), flows through Multnomah and Clackamas Counties to its confluence with the Willamette River at Milwaukie. The 54 square mile (140 square kilometers) basin ranges in elevation from over 1,100 feet (335 meters) to approximately 10 feet (3 meters). Natural streamflows in the creek are closely tied to the climatic and local geomorphic conditions. The regional climate is characterized by cool, moist winters and relatively dry summers.

FIGURE 1 - JOHNSON CREEK BASIN



Dense vegetation and deep soils have developed on undisturbed sites.

Two distinct hydrologically homogeneous regions have been described in the basin.¹ The portion of the watershed generally to the north of the main stem is composed of fluvial terraces and abandoned river channels. Gentle slopes and permeable soils favor infiltration of precipitation with the resultant subsurface flow providing much of the base flow of Johnson Creek. The area to the south of the stream is characterized by steeper slopes and soils of low infiltration capacity. Impediments to downward percolation lead to surface and shallow subsurface runoff. Consequently, relatively little base flow is provided by this portion of the basin.

Under natural conditions, streamflow in Johnson Creek varied considerably with high flows and occasional floods in the winter, and low flows during the summer. Stream temperatures at low flow were moderated by a dense riparian canopy and the relatively constant stream environment provided a favorable aquatic habitat. Land use changes have tended to accentuate the variability of physical, chemical, and biological conditions in the stream system.² Estimated land use in the basin is sixteen percent forested, thirty-four percent pasture and cropland, and fifty percent urban, industrial, and other uses.³ Development in the basin has continued since these estimates were derived in 1973,

when eighty-four percent of the watershed had been altered from natural conditions.

INSTITUTIONAL SETTING

Watershed management in the Johnson Creek Basin is the charge of public agencies from the local through the federal level. Political coordination of these agencies has been a key factor in the history of conflicts regarding watershed improvements in the basin. A description of the public entities with an interest in Johnson Creek is given to provide a background for further analysis of these conflicts.

There are six local entities with land use jurisdiction within the basin. Johnson Creek flows east to west along the border between Clackamas and Multnomah Counties. (Figure 1) The stream also flows through portions of the cities of Portland, Milwaukie, and Gresham. A small parcel of the City of Happy Valley also lies within the drainage area, but is not located directly on the stream. (Table 1)

TABLE 1 - Local Jurisdictions in the Johnson Creek Basin ⁴

<u>Political Subdivision</u>	<u>Jurisdictional area</u> <u>(sq. mi.) (sq. km.)</u>	
Multnomah County	35.75	92.59
Clackamas County	15.34	39.73
City of Gresham	8.94	23.15
City of Portland	7.85	20.33
City of Milwaukie	1.74	4.51
City of Happy Valley	0.17	0.44

In addition to the local jurisdictions, two regional agencies conduct activities in the basin. The Columbia Region Association of Governments (CRAG) is an agency with responsibility for regional planning in Multnomah, Clackamas, and Washington Counties. It was formed in 1966 to administer regional planning in the Portland metropolitan area. CRAG released an interim action proposal for the Johnson Creek Basin in 1974 which suggested several alternatives for water management.⁵ The agency is also in charge of regional waste water planning for the Portland area under Section 208 of Public Law 92-500.

The second regional agency is the Metropolitan Service District (MSD), the formation of which was authorized by a vote of the people in 1970. The MSD was established in order to implement plans dealing with sewer facilities, solid and liquid wastes, and control of surface water. It has jurisdiction over much of the Portland vicinity, including ninety percent of the Johnson Creek Basin, and is able to obtain authority over the remainder of the basin.⁶ The MSD prepared a drainage management program for Johnson Creek in 1975.⁷

Several agencies of the State of Oregon have been involved with Johnson Creek. The Department of Environmental Quality (DEQ) is given statewide authority for waste

water management and water quality. The agency conducted a water quality study of Johnson Creek from 1970 to 1975 and published a report detailing water quality problems in the basin.⁸

The Oregon Water Resources Department is charged with administration of state water policy and water rights laws. The Department has participated in technical reviews of proposals for alleviating flood conditions along Johnson Creek.

The Oregon Department of Fish and Wildlife is given the responsibility of managing the fish and wildlife species of the state. The agency conducts an annual trout stocking program in Johnson Creek during the spring months.

Local governments with land use jurisdiction are subject to policies administered by the Oregon Land Conservation and Development Commission (LCDC). These policies are issued in the form of statewide planning goals and guidelines, some of which address water resource problems in a general manner.

Three federal agencies have been directly involved with water resource management in the Johnson Creek Basin. The Soil Conservation Service (SCS) is able to cooperate with local governments in constructing small reservoirs in headwater areas through the Watershed Protection and Flood

Prevention Act of 1954 (Public Law 83-566). Although the SCS is not currently involved in active planning in the basin, preliminary studies for construction of three small dams in the upper watershed of Johnson Creek were done in 1969.

The United States Department of Housing and Urban Development (HUD) administers the National Flood Insurance Program. This program was established in 1968 to provide insurance at subsidized rates to residents of flood prone areas and to discourage future unwise development of flood plains.⁹ The Flood Insurance Program is limited to residential dwellings of one to four families and small businesses. In order to become eligible, local governments must show a need for the insurance and adopt flood plain regulations designed to limit losses due to flooding. Once a local jurisdiction has qualified, subsidized insurance rates become available for current occupants of the flood plain, whereas actuarial rates must be paid for future developments on flood prone property. Upon local participation, flood insurance becomes a requirement for federally assisted construction in flood plains. Local jurisdictions in the Johnson Creek Basins have qualified for the Flood Insurance Program.

The United States Army Corps of Engineers became involved with flood control through a series of Congressional

acts beginning in 1936. The Corps of Engineers has studied a channelization project for Johnson Creek in 1958 and again in 1975. The agency is currently conducting a water resources study in the Portland-Vancouver area.¹⁰ This study, to be completed in 1979, was requested by CRAG and will aid that agency in its regional waste water planning function. The study seeks to address regional water resources problems in a comprehensive manner and is intended to provide realistic management alternatives from which regional and local concerns may select plans.

MAN'S IMPACT ON JOHNSON CREEK

The institutional framework described above contains the agencies responsible for management of Johnson Creek. The stream has become a management problem as a result of physical impacts to the stream system brought on by watershed urbanization.

Flooding has been the problem most often discussed regarding Johnson Creek. Although flooding occurred long before any developments in the basin, urbanization in other watersheds has been shown to increase the severity and frequency of the phenomenon. This effect is due partially to the larger proportion of impervious surface area associated with urban areas and more rapid removal of surface runoff through storm sewers and artificial channels. Flooding problems are compounded by accumulation

of debris and sediment in stream channels as well as by structural encroachments, all of which tend to reduce the capacity of the stream to handle peak discharges. It has been estimated that one-third of the Johnson Creek stream channel has been constricted by structures of various types.¹¹ Flood damages were computed to average \$476,000 annually in 1975 and are expected to increase in accordance with more development in the basin.¹² The most critical area of flooding is in the middle reach of the stream where the flood plain is the widest and a low stream gradient allows deposition of debris.

Low, warm summer stream flows are the primary reason for poor fish production in Johnson Creek.¹³ Increases in impermeable area are presumed to be partially responsible for decreases in ground water recharge and a lowering of base flows. Irrigation withdrawals have also been cited as a factor in lowering base flows in Johnson Creek.¹⁴ Low stream flows combined with debris accumulation result in summer stagnation and poor water quality conditions. The lower fifteen miles (twenty-four kilometers) of Johnson Creek are unsuitable for survival of native salmonids during the summer low flow period.

Water quality problems also exist during periods of high flow in Johnson Creek. Bacteriological contamination from septic tank seepage in the unsewered portions of the basin occurs during both high and low flows. Con-

centrations of bacteria commonly exceed the criteria established by state water quality regulations. Abnormally high nutrient levels in the stream can be attributed to agricultural runoff, urban runoff, and septic tank failures.¹⁵ During high flows, erosion of the channel and disturbed watershed lands provides sediment which is deposited along the stream course. This sediment, in addition to aggravating flood conditions, limits the survival of organisms dependent on a gravel stream bottom.

The deterioration of the stream quality of Johnson Creek is not irreversible. Measures can be undertaken to improve conditions which have resulted in the problems now experienced in the basin. Recommendations put forth by the Oregon Department of Environmental Quality include implementation of a sewage program, control of point pollution sources, removal of excess channel debris, placement of limitations on streamside encroachment, study of runoff control measures for the basin, and development of a plan for augmentation of low stream flows.¹⁶ The decision of whether to engage in such efforts lies with the institutions charged with land and water resource management in the basin.

CRITERIA FOR EVALUATING WATER MANAGEMENT INSTITUTIONS

Solutions to the problems seen in the Johnson Creek Basin can be viewed in terms of water related services. These services reflect the expressed needs of the public and include flood hazard mitigation, water quality improvement, fishery enhancement, and provision of recreational opportunities. The public sector is in large part held responsible for providing and regulating these services.

Characteristics of Water

Several characteristics of water resources tend to complicate their management and are illustrated in the Johnson Creek situation. First, water resources have multiple uses which often conflict. An example of such a conflict is the use of Johnson Creek as a conduit for carrying waste products at the same time that recreationists seek to utilize the stream. The management system must therefore allocate the resource with the intention of minimizing incompatibility of competing uses.

A second characteristic is based on the fact that water is a mobile resource. Consequently, there are interdependencies in the hydrologic system such that activities in the upper portion of the stream basin will affect downstream uses. The water quantity and quality problems of Johnson Creek, which are largely the result

of changing land uses in the basin, exemplify this principle. In order to fully consider unwanted spill-over effects brought on by hydrologic interdependencies, management consideration must be given to the stream basin as an integrally functioning unit.

A final characteristic, that of regional discontinuities, is significant as a management factor in the basin. This concept relates to the common situation that the jurisdictions in charge of managing the resource do not spatially coincide with the physical system. In the case of Johnson Creek, the result has been a fragmentation of authority to the degree that comprehensive management of the watershed has not occurred.

Institutional Evaluation

The institutions charged with managing water may be analyzed within a framework of criteria proposed by Craine.¹⁷ Several of the criteria are directly tied to the previously described characteristics of the water resource. The criteria may be used to determine whether the institutions are able to overcome the conflicts and implement an effective management policy.

The first criterion asks whether the institutional system is able to apply the complete range of governmental techniques in managing water. It seeks to determine if the management system is given the necessary power to examine

the resource system, determine what needs exist, select a plan of action, and then regulate or develop the water resource consistent with the selected policies. Legislative authorizations should give the management system the ability to implement its decisions and responsibility for carrying out management decisions should be coordinated under some unified command.

The second criterion is concerned with the ability of the institutions to adapt to effects of hydrologic interdependencies. The most direct way to accomplish this is to centralize management of the entire basin so that the spillover effects must be automatically considered in the decision making process. Alternatively, provision may be made for interagency exchange of payments to adjust the benefits or damages accruing from interdependencies.

Flexibility to adjust to changing needs forms the basis of the third criterion. Since water resource decisions need to be reassessed as societal needs change, a mechanism should be provided to allow the institutional system to react to these changes. There must, however, be established a balance between flexibility and stability in order to provide against arbitrary actions.

A fourth consideration revolves about the ability of the management system to consider a wide range of values in reaching decisions. The interrelated multiple

uses of water make it imperative that all interests are allowed representation in the decision making process. This can be done through interagency review procedures and representative selection of members on governing boards. It is especially significant to assure that the desires of the constituency are considered in the process since a lack of public support can lead to the demise of the selected policies.

The final criterion addresses the ability of the institutions to finance water management. Financial problems may arise if there are practical constraints in raising capital and operational funds, or if inefficiencies are encouraged through disconformities between those who pay for management and those who benefit. Funding problems have contributed greatly to the failure of many programs, including several in the Johnson Creek Basin.

If all of the above criteria can be met within the institutional system, a picture of "ideal" water management begins to form. In such a system, the stream basin would be treated as a fundamental management unit. Mechanisms would be available for consideration of all interests and legislation would provide the necessary power for funding and implementation of a course of action. The selected program presumably represents the optimum combination of compromise to meet the expressed needs. Such a system exists strictly in theory and actual water management systems can only attempt to approach it.

PREVIOUS MANAGEMENT PROPOSALS

Several studies and reports have been released regarding stream and watershed improvement programs for the Johnson Creek Basin. None of these proposals has been implemented, a situation which can be partially explained through non-compliance with the evaluation criteria proposed by Craine.

Soil Conservation Service

The SCS at one time informally proposed feasibility studies for three small dams in the upper Johnson Creek Basin. This proposal has never resulted in a detailed study partially due to a lack of local support. The locations of the potential reservoirs are currently being developed which further limits the likelihood of a study. If constructed, storage or detention reservoirs could provide flood control, low flow augmentation, and recreation benefits. The SCS is not currently pursuing construction of these reservoirs, and it has been indicated that a strong local sponsor and public support would be firm requirements to initiation of the projects.¹⁸

CRAG Interim Action Program

In 1974, CRAG issued a report which recommended an interim action program to deal with the Johnson Creek Basin situation. The investigation considered establish-

ment of a building moratorium in the basin along with other alternatives. Among the recommendations to local jurisdictions were that growth be channeled into urbanized portions of the basin, improved flood plain ordinances be adopted, runoff detention facilities be required when issuing building permits, and rural zoning be established in as much of the basin as possible. These policies were never implemented in a coordinated manner as there was no mechanism for requiring local jurisdictions to comply. CRAG has currently deemphasized its involvement in the basin due largely to a lack of support from the public and local agencies.¹⁹

Corps of Engineers Channelization Proposal

Channel improvements were undertaken on Johnson Creek in the 1930's by the Works Progress Administration (WPA). This project, which consisted of hand-placing rock banks and reshaping the stream channel, has become ineffective due to a lack of maintenance.

In 1950, Congress authorized the Army Corps of Engineers to study the feasibility of providing additional channel improvements. Local sponsorship requirements were to have been fulfilled by the Johnson Creek Water Control District which had been formed in 1949. A plan consisting of structural channel modifications was released in 1958 when costs were estimated to be \$535,000 federal and

\$275,000 non-federal. The water control district began raising the necessary funds to supply easements, but a construction levy failed in 1964. A subsequent vote resulted in dissolution of the district and the project became inactive.

In 1971, the newly formed MSD agreed to act as the local sponsor for the project. The Corps of Engineers then began a restudy of the original plan and completed this effort, incorporating some changes, in 1975.²⁰ By this time, the costs had risen to \$2,250,000 federal and \$1,135,000 non-federal. A benefit to cost ratio of 2.6 to 1 was calculated. Within the restudy, it was recommended that the project again be classified inactive pending assured fulfillment of the local sponsorship requirements.²¹ These requirements include provision of rights of way, lands, and easements, maintenance of the completed project, relocation of public facilities as necessary, and protection of the Federal government from legal disputes.

During 1975, the MSD received grants to study funding alternatives for these sponsorship obligations and to investigate other solutions to the basin's drainage problems. As a result of this study, the MSD chose not to fulfill the requirements and instead released its own drainage management plan.

MSD Drainage Management Plan

The MSD staff recommended a program in 1975 which sought to treat the stream and watershed system in a comprehensive manner.²² Among the goals in the plan were reduction of flooding conditions and mitigation of water quality problems through a coordinated drainage management policy. It was intended to use the natural runoff system wherever possible and to encourage the use of nonstructural measures. The plan was designed to address the immediate flooding needs through an annual maintenance program and also to provide a framework for investigation of future long range solutions. The ultimate objective was the development and implementation of a master plan for drainage management in the basin.²³

The long range scheme for financing the program was to be through assessment of a service fee whereby occupants of the basin would be charged in accordance with the amount of impervious area on their property. A similar funding method is successfully being used in Belleview, Washington and several other cities.²⁴

The MSD proposal was presented at three public hearings in the basin during early 1976 at which considerable public opposition was voiced. The first year funding for the program was to have come from the State Emergency Board. Citing the indications of a lack of public support, the Oregon Water Resources Department declined to act on behalf of the MSD, with the result that the initial fund-

ing failed to materialize. The MSD staff subsequently recommended abandonment of the plan in favor of a set of interim policies while awaiting completion of the Metropolitan Area Water Resources Study. The interim program was focused on encouraging local jurisdictions to implement channel maintenance activities and for the MSD to adopt ordinances to control surface runoff. Coordination with the Corps of Engineers and CRAG to develop long range technical and financing solutions was also suggested. These interim measures are not being pursued due to a lack of staff funding in the MSD.²⁵

Evaluation of Prior Proposals

None of the proposals suggested for management of Johnson Creek have progressed to the stage of implementation. There are many interrelated reasons for their failure and an analysis of these may be carried out by considering the previously explained criteria for evaluating water management institutions. The SCS proposal was offered only informally and has not been studied completely as an alternative. The fact that such a study has not occurred is more an indication of a lack of interest in the proposal rather than a failure of the program. The other three proposals, however, were offered with the intention of implementation, but were met with disinterest and/or opposition.

The CRAG interim program sought to coordinate local jurisdictions through adoption of a set of common policies. The fact that these policies remain unused represents a failure to comply with the first criterion. Specifically, the agency was unable to apply the techniques necessary to implementation of its decision.

The Corps of Engineers channelization project was criticized for not addressing basin problems in a comprehensive manner and not adequately considering alternatives to channel improvements.²⁶ Thus, this study may be cited for not accounting for the wide range of values relevant to water resource decisions. The plan was essentially a single purpose structural solution to a series of related problems more suited to an approach involving multiple purposes and multiple means.

The drainage management plan proposed by the MSD sought to establish a comprehensive set of policies to consider the watershed as a unit. Funding problems, as suggested in the fifth criterion, were perhaps the single most important factor in the failure of the proposal. The problems encountered with financing may be traced largely to the opposition expressed by local basin residents. At public meetings, concern was expressed that the plan was open-ended and a general dislike for additional property assessments was voiced. It is also apparent that many basin residents did not feel it was their responsibility to pay for flooding problems which impacted only properties

along the stream. Consequently, it may be inferred that the MSD failed to account for the necessary range of values by not considering input from basin residents prior to drafting of the proposal. However, the MSD management scheme did begin to adapt to hydrologic interdependencies through its treatment of the entire basin as the fundamental jurisdictional unit.

ALTERNATIVE SOLUTIONS

There exists a great variety of measures which may be undertaken to alleviate problems brought on by urbanization of small watersheds. In the Johnson Creek Basin, it is generally agreed that some form of channel clearing and an ongoing maintenance program will be necessary to increase the capacity of the stream to pass peak flows without flooding. Beyond this concensus, there appears to be little unanimity regarding the optimum combination of technical or political measures which would provide solutions to the problems in the basin.

The extreme form of a channel clearing program would involve complete channelization of troublesome stream sections. In such an approach, the natural stream channel is reengineered and replaced with a man made hydraulic section. This means of handling flood flows has often met with disfavor since it necessarily involves a high degree of impact to the stream environment. A less damaging method would consist of removing only excess debris and

constrictions while retaining as much of the natural channel as possible.

Another potential means of alleviating flooding falls under the general category of regulation of runoff. In this approach, the rate of storm water runoff to the stream from developments is controlled so that natural runoff rates are maintained. Runoff detention systems may consist of ponds which detain flows and release water to the stream at a later time. An alternative method involves an infiltration network in which surface flows are directed underground to become subsurface water. Examples are cited where runoff detention systems have been less expensive than conventional storm drainage sewers.²⁷ Detention ponds may also be useful in augmenting low flow conditions.

It has been recommended that detention measures be carefully considered as an alternative to conventional storm sewers in the Johnson Creek Basin.²⁸ It is legally permissible for jurisdictions to require runoff detention provisions as a condition of issuing development permits. It should be noted that runoff regulation must be implemented in a coordinated manner since improper design and placement of systems may lead to increases in discharges under certain conditions.²⁹ Detention facilities must also be continually maintained in order to assure effective operation.

Development of a flood plain greenway represents another means of reducing flood damages. A greenway may involve a range of alternatives from negotiation for flooding easements to outright purchase of streamside property. If a public park corridor were developed along Johnson Creek, recreation benefits would be available to residents outside of the basin. This may allow for justification of seeking funds from other than strictly local sources. Significant barriers to implementation of a greenway concept are the cost of purchasing property or easements as well as conflicts which often arise when public purchase of private property is sought.

Other alternative management measures have been suggested and may be feasible as part of a comprehensive program for Johnson Creek. These measures include temporary building moratoriums in portions of the basin and rural zoning restrictions in certain undeveloped areas. A key factor in reducing pollution in the stream will be to continue extension of sewer services to areas of the basin now reliant upon septic tanks. However, sewer service extension must be weighed against its effects of spurring additional growth which may result in further disruption of the hydrologic system.

None of the measures described can alone provide a solution to the interrelated problems brought on by watershed urbanization. An uncoordinated approach wherein

certain policies are implemented only in some parts of the basin will also be inadequate in the long term. An effective watershed management plan would likely consist of a combination of these measures, but planning and implementation must be done in a comprehensive manner.

POTENTIAL FOR IMPROVED MANAGEMENT

Due to the failure of prior basinwide planning attempts, water management in the Johnson Creek Basin at this time essentially lies with the local governments which have land use jurisdiction. There is no common policy which addresses the watershed problems of the basin, and the result has been a continuing deterioration of stream conditions as well as a growing risk of damaging floods. Furthermore, it does not appear that any agency is currently active in pursuing a basinwide management plan.

The MSD is the jurisdiction with the legal capability to coordinate and direct a basinwide plan. This agency is currently not developing such a plan due to an inability to gain staff funding. It appears to the MSD staff that drainage management will not occur until flood plain residents support the efforts or until total funding from outside sources is supplied.³⁰

CRAG is also no longer actively working on water management of Johnson Creek in favor of areas where public

support is evident. The agency staff notes a possibility of funding for the basin through a statewide program involving declaration as an area of regional significance. A proposal for such a designation could come from any source including citizen groups.³¹

There is evidence that the local jurisdictions in the basin are concerned about management of Johnson Creek. The recently adopted Multnomah County Comprehensive Plan recognizes the impact of continued urban development on runoff and acknowledges a need for construction of detention basins. The plan also suggests enhancement of recreational potential through use of detention basin sites as parks and application of flood control measures such as debris removal.³² The Multnomah County Division of Parks and Memorials has tentative plans for establishment of a greenway of parks along Johnson Creek. Long range planning is scheduled to begin at the end of November, 1977.³³

The Clackamas County Planning Department has recently published a series of general policies concerning Johnson Creek.³⁴ These policies remain subject to adoption by the County Planning Commission and Board of Commissioners. The primary objective indicates that the county will seek a lead role in developing an improved management program for Johnson Creek. Among the policies due for consideration are to support development of small upstream reservoirs,

promote extension of sanitary sewers to major sources of sewage, control runoff from intensive development sites, initiate an annual stream clean-up program, and prevent additional streamside encroachment through flood plain zoning and bank setback restrictions. It is further intended that the county acquire vacant and underdeveloped properties near the stream and that all existing drainage and flooding problems be treated within the context of creating a permanent public parkway.

The City of Gresham has already acquired park lands consistent with the greenway concept along Johnson Creek. The City also recently required developers of a residential area to control runoff rates using infiltration techniques.

The most recent proposal for a greenway has been developed by the Portland Bureau of Parks.³⁵ This plan envisions utilizing the Johnson Creek stream course as part of a Greater Portland Loop involving development of bicycle trails and purchase of flood plain lands. The Johnson Creek portion of the system would be connected with trails utilizing stream corridors and parks around the periphery of Portland. The status of the proposal is dependent upon a levy currently before the Portland City Council. There are indications of opposition since the system would be developed by the City, but also used by outside residents.

The above examples evidence the concern about management of Johnson Creek by local jurisdictions. It appears

that what is now needed is for the regional agencies (MSD or CRAG) to actively seek new sources of funding to allow their staffs to coordinate the efforts of the local governments. Informal contacts with representatives of CRAG and the Army Corps of Engineers have made it apparent that the Portland-Vancouver Metropolitan Area Water Resources Study, due for completion in 1979, will not specifically suggest detailed management alternatives for the Johnson Creek Basin. Therefore, waiting for its completion to initiate a coordinated program may only serve to further delay adoption and implementation of corrective measures.

A firm requirement toward initiation of a basinwide program appears to be greater consideration of public sentiment, as lack of public support has been a chronic problem in earlier failures. Random interviews conducted in 1977 suggest that basin residents are generally unconcerned about water related problems that do not affect them.³² It is apparent that many residents of the watershed do not understand the hydrologic interdependencies which result in problems of flooding, poor water quality, and deterioration of stream habitat. Many residents are also not aware of the types of solutions necessary to solve these problems. Residents closer to the stream generally tend to show greater awareness of the situation.

Sentiment expressed at hearings held by the MSD indicate that many residents feel a greater proportion of funding should come from sources outside the basin. Perhaps a key component to future management decisions will need to be an active public information and citizen involvement program.

It is suggested that the institutional system presently in existence in the Johnson Creek Basin has the capability to develop and administer a comprehensive management program. There are two regional agencies which have the ability to gain jurisdiction over the entire basin. CRAG, with regional land use jurisdiction, and the MSD, with structural and regulatory implementation capabilities, could serve the role of coordinators. Several key requirements which have not been adequately addressed in previous efforts will need to be met. Perhaps the most significant factor will be an active campaign to solicit and incorporate public opinion during the planning process. Another important consideration is to seek out and analyze alternative forms of funding. This effort should consider what proportion of the cost can reasonably be expected from basin property owners and how much could be derived from outside sources. Finally, it is the contention of the author that any management plan must treat Johnson Creek and its watershed lands as a naturally functioning ecosystem. Only in this way can the complete

range of quantifiable as well as intangible values of the stream system be realized.

FOOTNOTES

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- 2 Oregon Department of Environmental Quality, Water Quality in Johnson Creek (Portland, 1975), pp. 3-4.
- 3 Ibid., p. 1.
- 4 Columbia Region Association of Governments, Drainage Management in the Johnson Creek Basin - CRAG Interim Action Program (Portland, 1974), p. 16.
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